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2023 - 2024



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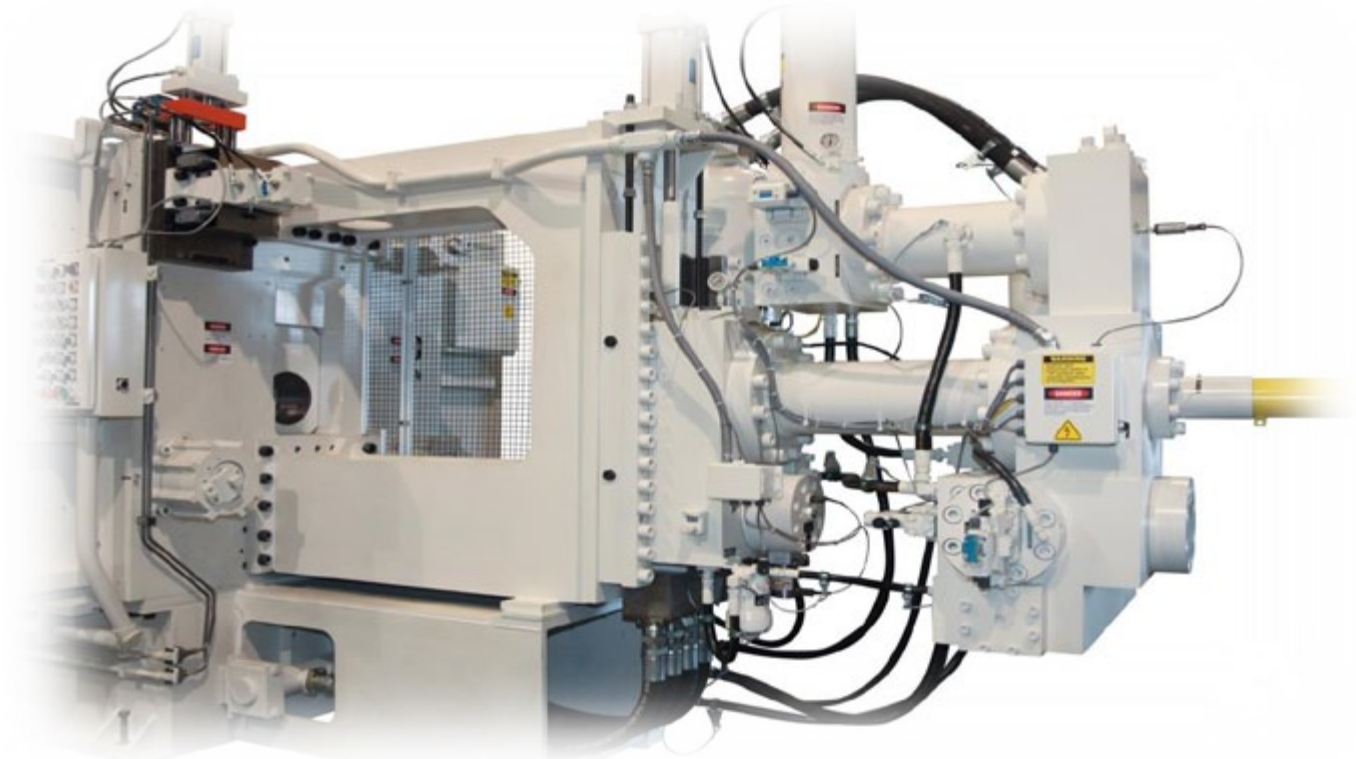
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Chapter 3

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Editorial Information

The NADCA Chapter 3 Member Directory is a nonprofit publication, developed annually by the Chapter 3 Board Members. Advertising proceeds benefit Chapter 3 members, future, and current die casting professionals via free chapter dinner meetings, educational classes, scholarship awards, and much more.

Every effort has been made to avoid errors, misspellings, and omissions. If an error comes to your attention, please accept our sincere apologies and notify us so we may correct it in future issues.

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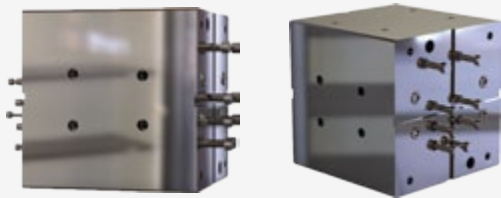
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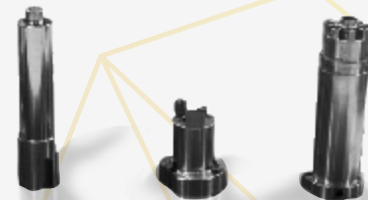


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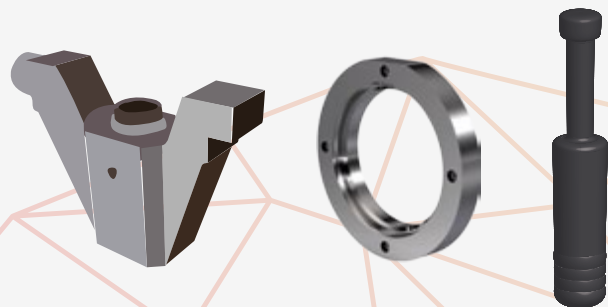
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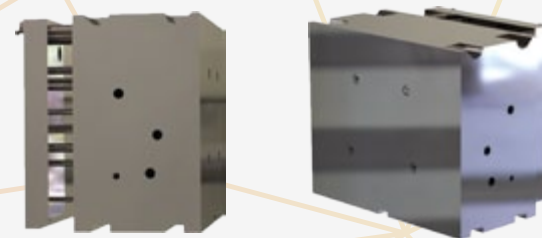
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**LETTER FROM OUR
NADCA CHAPTER 3 CHAIRPERSON**

2023 - 2024

As a Chapter, Our Goal is to:

- Advance the science of die casting through education and research.
- Provide knowledge and application to the projects of our industry.
- Support the study and development of best practices related to die casting.
- Provide, evaluate and exchange information related to Safety, engineering, metallurgy and mechanics in the industry.
- Educate, train and recruit young people into the field of die casting.

Year Synopsis

2022 has been a good comeback year for Chapter 3. Attendance of our in-person meetings continues to increase. Our Golf Outing was very successful. Our chapter continues to grow, we currently have 330 plus members. As a chapter, we awarded 9 internal scholarships and provided \$10,000 to WMU Endowment Fund for 3 WMU students to obtain a scholarship.

Chapter Meetings

Our spring dinner meetings are a great way to learn about industry related topics as well as connect with other industry professionals. We have moved our meetings downtown Grand Rapids for easy access for all. Pizza, drinks and education, what a great way to learn. Please check the website for dates and locations. www.nadchapter3.org

Golf Outing

Once again, we want to say thank you to our Golf Outing duo, Steve Barendse and Steve Ridders for putting together a successful event. We use 100% of the golf proceeds to support education of our industry piers as well as awarding college scholarships to students in our industry.

Upcoming 2023 Event

The NADCA Die Casting Congress and Tabletop is scheduled for September 19-21, 2023, in Grand Rapids Michigan. We would encourage everyone to attend the NADCA event. Chapter 3 plans to help support this event. Please watch for future emails or check out www.nadchapter3.org for additional September meetings. We will post additional topics, dates and times.

Membership Directory

We feel this directory is one of the best resources for local Die Casters and suppliers. Under the guidance of Jonathan Burns and Steve Ridders and their team, the Chapter 3 Board members would like to say Thank You for a Job well done. If your company is interested in advertising in the upcoming directory, please reach out Jonathan or Steve. All information is located on the NADCA chapter website. www.nadchapter3.org

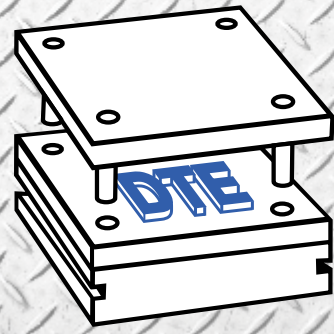
Thank you for your continued support,

Todd Ikerd
NADCA Chapter 3 Chairperson



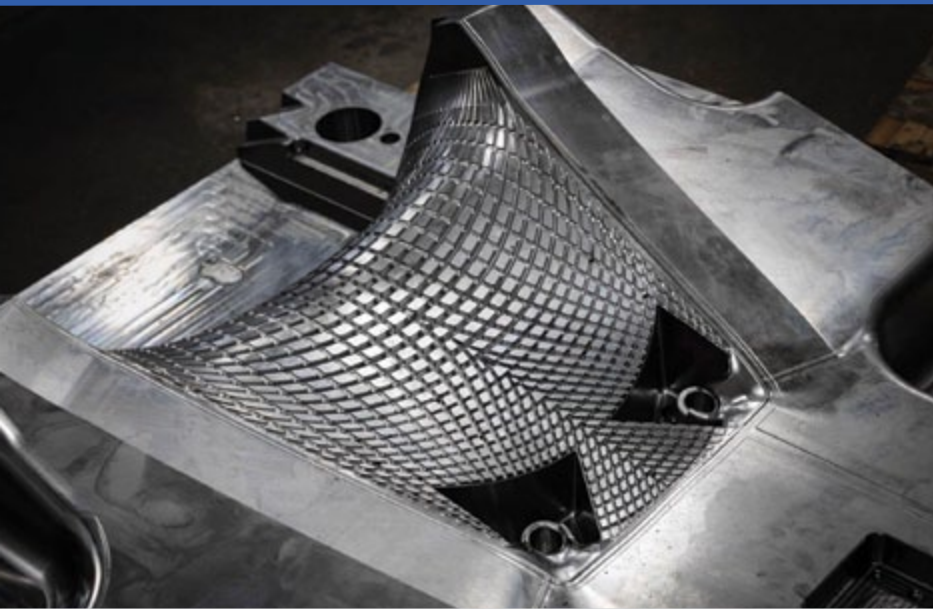
Todd Ikerd
NADCA Chapter 3 Chairperson

"Thank you for participating in this year's events for Chapter 3. It's your involvement that helps make Chapter 3 one of the most active and successful chapters of NADCA."

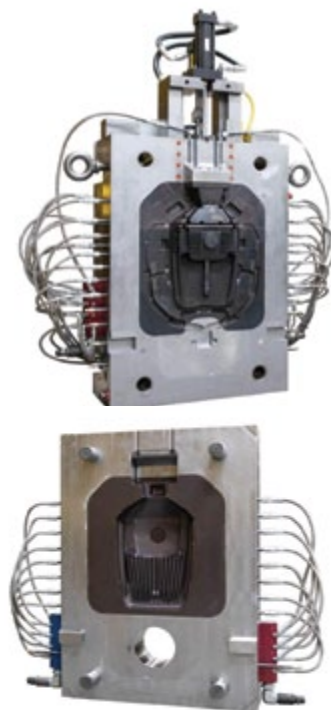


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STATE OF THE DIE CASTING INDUSTRY

Stephen P. Udvardy, President
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The year 2022 continued to pose challenges for much of the die casting industry and many in other manufacturing sectors, as well as many in other industries. Supply chain issues and a shortage of workers are two main challenges that have not only impacted our operating companies but also the national economy through resultant high inflation rates. As our country and others around the globe attempt to bring inflation back into control and we ask if there is any light at the end of the tunnel, and how long the tunnel really is, forecasts indicate that 2023 and 2024 will be up years in comparison to 2021 and 2022.

In this edition of the State of the Die Casting Industry article, information is provided on key accomplishments of the Biden Administration, macro-economics, overall manufacturing indicators, major markets served by die casting, die casting shipments, and a forecast for casting shipments.

Biden Administration Accomplishments

It is already nearly mid-way through President Joe Biden's first term in office. When taking office, top priorities of the Administration were the fight against the coronavirus (COVID-19), economic recovery, the environment/climate change, immigration reform, healthcare, racial equity, and restoring America's global standing. As explained below, there have been some key accomplishments after two years, however, progress has yet to be made on some fronts.

A key accomplishment on the fight against COVID-19 is the passing of the American Rescue Plan which was signed into law on March 11, 2021. This \$1.9 trillion economic stimulus bill increased COVID-19 testing and vaccination, extended unemployment insurance, provided direct assistance to households, and provided support for small businesses. Under the plan, the Affordable Care Act has reportedly reduced healthcare premiums by \$800 per year. To present, it is estimated that the plan has helped to administer more than 500 million vaccinations for Americans. Although COVID-19 and its variants are not totally behind us, the situation today is greatly improved over 2020 and 2021.

The passing of the Inflation Reduction Act of 2022 is a key accomplishment that has several components including support for economic recovery, the environment, and climate change. Hence, it is also referred to as the Climate Bill. The \$739 billion bill was signed into law on August 16, 2022 and is targeted to assist in reducing inflation. Although it has not curbed inflation to a great extent as yet, the intent is to reduce the federal budget deficit, lower prescription drug prices,

and invest in domestic energy production including clean energy. The bill represents the largest investment in climate change in U.S. history (about \$369 billion) and includes a tax reform component. This bill was a result of the re-worked Build Back Better Act and does not include all of what the Build Back Better Act initially proposed.



Figure 1 - President Biden Signing Legislation into Law.

The CHIPS and Science Act, also a key accomplishment, was signed into law on August 9, 2022. Perhaps not initially stated as a top priority, but in recognition of the issues caused by the chip shortage, this bill provides roughly \$280 billion in funding over a 5-year period to boost domestic research and manufacturing of semiconductors in the United States. The bill also includes support for new manufacturing institutes, funding for training and regional technology hubs, and a new advance manufacturing investment credit.

Another key accomplishment, also perhaps not stated as a top priority, is the \$1.2 trillion Bipartisan Infrastructure Framework bill that was signed into law on November 15, 2021. This bill adds \$550 billion in funding for new projects and utilizes the remaining \$700 billion to fund existing projects.

Through the key accomplishments, good progress has been made in the fight against COVID-19 priority and support is being provided for the priorities of economic recovery, climate change, and healthcare. Re-joining of the Paris Agreement and strengthening the NATO alliance in support of Ukraine due to the Russian/Ukrainian war, speak to the priority of restoring America's global standing. Therefore, some of the top priorities of the Administration are being addressed.

On other fronts such as trade and regulatory activities, it appears that the Section 232 tariffs on steel and aluminum products will stay in place through at least December of 2023. Lifting of all Section 301 tar-

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iffs on products from China is not expected. The proposed OSHA 80°F Heat Index Rule may not be out until 2024, but OSHA is currently stepping-up inspections. Although new EPA standards for items such as particulate matter, oil and gas, and climate change risk may not be released soon, the EPA is stepping up enforcement activities.

As related to the die casting industry, there are accomplishments and activities under the Biden Administration that provide for opportunities while others may prove to have a negative impact.

Macro-Economics

Inflation is an economic hot topic, not only in the U.S. and the rest of North America, but around the world. Inflation began rising above the targeted 2%-3% rate in the second quarter of 2021. Initially, the Federal Reserve considered the rise to be transitory before changing its opinion and increasing interest rates. High inflation has continued since, and the annual inflation rate for the U.S. was 7.7% for the 12 months that ended October of 2022. (For the same time period, inflation in Canada was 7.2% and inflation in Mexico was 8.4%). (See Figure 2). The October 2022 level of 7.7% is down from 8.2% in September 2022, and was the lowest in four months. The Inflation Reduction Act coupled with the Federal Reserve increasing interest rates appear to be curbing the rise in inflation to some extent. Inflation had risen to a forty-year high of 9.1% in June 2022. The rate of inflation for 2021 was 7.0% and

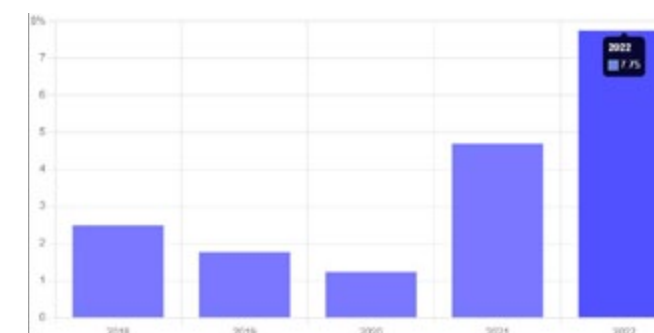


Figure 2 - Annual Average Rate of Inflation for 2018-2021 and recent USD annual rate of inflation as of October 2022 from the Bureau of Labor Statistics CPI.

the annual average rate of inflation for 2021 was 4.7%. (See Table 1).

During the first bout with COVID-19, the Federal Reserve cut the federal funds rate from about 1.5% to nearly 0% to assist in stimulating the economy. The federal funds rate is the central interest rate which influences other interest rates such as rates for personal loan, mortgage loans, and savings. As inflation started creeping in, the Federal Reserve aggressively started raising interest rates to fight inflation. After several interest rate hikes, the federal funds rate was set at 3.83% by November 25, 2022. (See Figure 3). Some financial experts are of the opinion that the Federal Reserve has raised the rate more than necessary as it takes some time for interest rate hikes to impact inflation. Nonetheless, higher interest rates are here for the time being and they impact consumer sentiment and consumer spending. This in turn has an impact on sales of products in major markets for die casting, like automobiles, homes, and appliances, and therefore, also has an influence on GDP Growth.

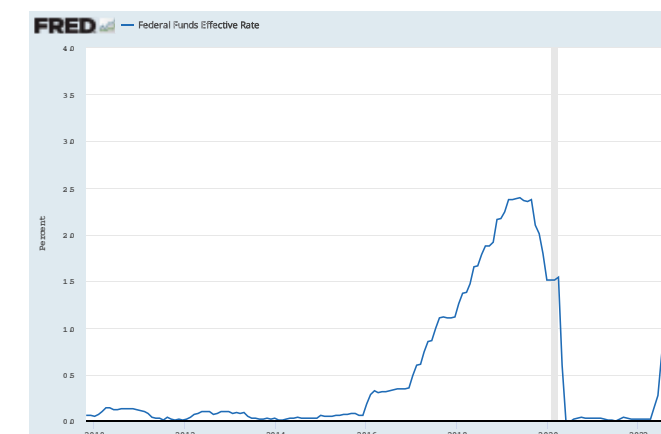


Figure 3 - Federal funds effective rate from 2009 through November 2022. Board of Governors of the Federal Reserve System (US), Federal Funds Effective Rate [DFF], retrieved from FRED, Federal Reserve Bank of St. Louis.

The U.S. GDP Growth Rate for 2021 was 5.67% and a 9.07% climb from 2020's -3.5%. The growth rate in the first quarter of 2022 was -1.6%. The second quarter showed less contraction at -0.6%, and the third quarter yielded an annualized growth of 2.6%, ex-

Table 1 - USD annual rate of inflation by month and annual average rate from the Bureau of Labor Statistics.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
2022	7.5	7.9	8.5	8.3	8.6	9.1	8.5	8.3	8.2	7.7			
2021	1.4	1.7	2.6	4.2	5.0	5.4	5.4	5.3	5.4	6.2	6.8	7.0	4.7
2020	2.5	2.3	1.5	0.3	0.1	0.6	1.0	1.3	1.4	1.2	1.2	1.4	1.2
2019	1.6	1.5	1.9	2.0	1.8	1.6	1.8	1.7	1.7	1.8	2.1	2.3	1.8
2018	2.1	2.2	2.4	2.5	2.8	2.9	2.9	2.7	2.3	2.5	2.2	1.9	2.4
2017	2.5	2.7	2.4	2.2	1.9	1.6	1.7	1.9	2.2	2.0	2.2	2.1	2.1
2016	1.4	1.0	0.9	1.1	1.0	1.0	0.8	1.1	1.5	1.6	1.7	2.1	1.3
2015	-0.1	0.0	-0.1	-0.2	0.0	0.1	0.2	0.2	0.0	0.2	0.5	0.7	0.1
2014	1.6	1.1	1.5	2.0	2.1	2.1	2.0	1.7	1.7	1.7	1.3	0.8	1.6
2013	1.6	2.0	1.5	1.1	1.4	1.8	2.0	1.5	1.2	1.0	1.2	1.5	1.5
2012	2.9	2.9	2.7	2.3	1.7	1.7	1.4	1.7	2.0	2.2	1.8	1.7	2.1

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ceeding forecasts of 2.4%. (See figure 4). The largest positive contribution to the expansion came from trade as exports were up and imports were down. Detracting from the growth was residential investment due to the impact of mortgage interest rates on the housing market. In addition, consumer spending grew but at a slower rate in the third quarter of 2022. The annualized GDP Growth Rate by the end of 2022 is expected to be 0.20%. (See Figure 5). According to Trading Economics' econometric models, the GDP Growth Rates for 2023 and 2024 are expected to be 1.20% and 1.70%, respectively.

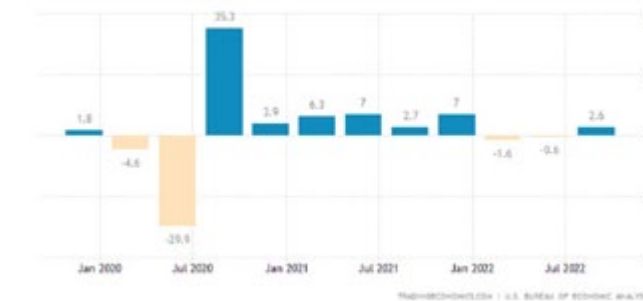


Figure 4 - The U.S. GDP growth rate in percent from the fourth quarter of 2019 through the third quarter of 2023 in percent. From Trading Economics.

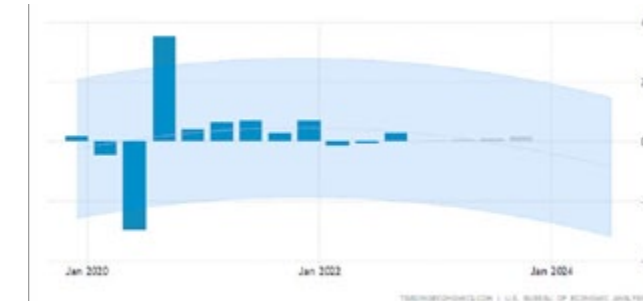


Figure 5 - U.S. GDP growth rate forecast in percent. From Trading Economics.

The Canada GDP Growth Rate for 2021 ended at 4.56%, climbing from -5.23% for 2020. The first two quarters of 2022 showed positive annualized growth rates of 0.8% for each quarter. (See Figure 6). Contributing to the growth the most was accumulation of business inventories. Another strong contributor was household spending on semi-durable goods and services. A rise in imports was a negative contributing factor. The GDP Growth rate in Canada is expected to hit 0.10% by the end of 2022. (See Figure 7). Longer term, the Canada GDP Growth Rate is projected to trend around 1.50% in 2023 and 2.00% in 2024, according to current econometric models.

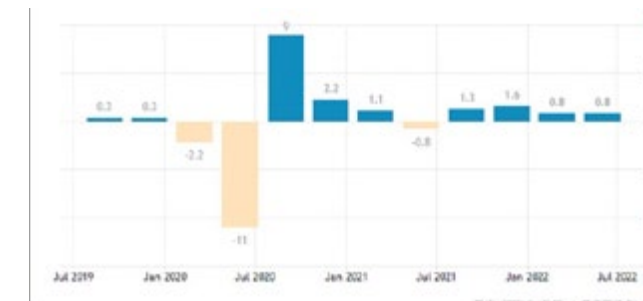


Figure 6 - Canada GDP growth rate from the third quarter of 2020 through the second quarter of 2022 in percent. From Trading Economics.

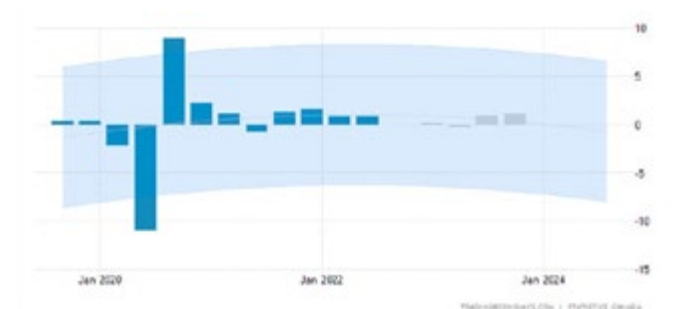


Figure 7 - Canada GDP growth rate forecast in percent. From Trading Economics.

The Mexico GDP Growth Rate for 2021 was 4.80% and a 12.17% climb from -8.17% in 2020. The Mexican economy expanded about the same amount in the first three quarters of 2022 with the first, second, and third quarters at 1.0%, 0.9%, and 1.0%, respectively. (See Figure 8). Agricultural output and services contributed to the mild growth from the second to the third quarter and there was no change due to manufacturing. The GDP Growth Rate for Mexico is anticipated to be 0.40% by the end of fourth quarter of 2022. According to econometric models, the Mexico GDP Growth Rate is expected to trend around 0.5% in 2023. (See Figure 9).



Figure 8 - Mexico GDP growth rate from the fourth quarter of 2019 through the third quarter of 2022 in percent. From Trading Economics.

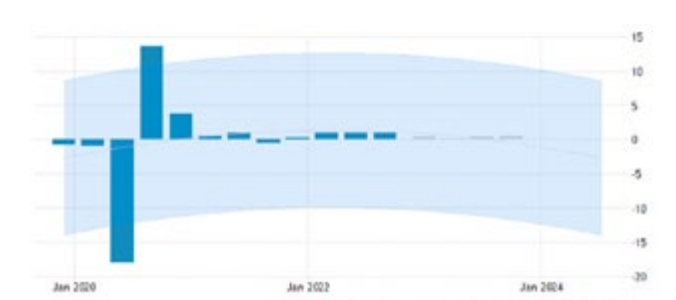


Figure 9 - Mexico GDP growth rate forecast in percent. From Trading Economics.

The consumer sentiment index for October of 2022 was 59.9 and an increase from 50.0 in June 2022. Immediately prior to outbreak of COVID-19, the consumer sentiment index for February 2020 was 101.0. To put an index of 59.9 and 50.0 into perspective, the lowest index during the great recession was 55.3 in November 2008 and the previous lowest index on record over the 40+ years of data was 51.7 in May 1980. The optimism of consumers has clearly been shaken. (See Figure 10). For further comparison, the highest consumer sentiment index on record is 112.0 and was seen in January 2000.



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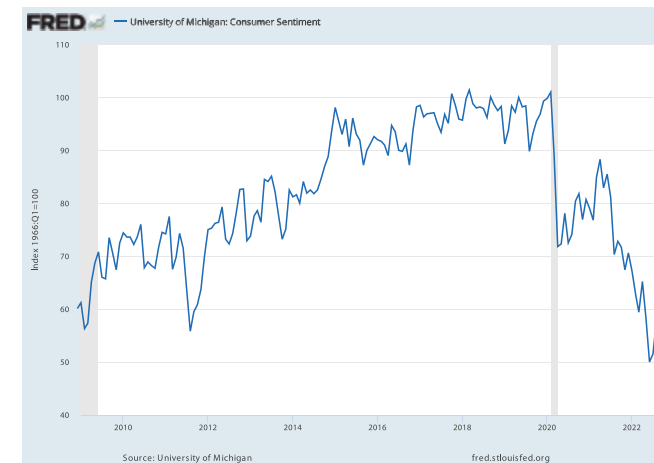


Figure 10 - Consumer sentiment index from January of 2009 through October of 2022. Surveys of Consumers, University of Michigan, University of Michigan: Consumer Sentiment © [UMCSENT], retrieved from FRED, Federal Reserve Bank of St. Louis

When the consumer index is up, consumers are more willing to buy. Conversely, when the index is down, consumers tighten their belts and are less likely to buy. The measure of real personal consumption expenditures shows the relationship between consumer sentiment and consumer spending. Since the start of COVID-19, the personal consumption was the lowest in the second quarter of 2020 with a percent change from the prior year's quarter of -9.5%. As stimulus money became available and consumer sentiment increased, so did personal consumption expenditures, and by the second quarter of 2021, the percent change from the prior year's quarter hit a whopping 16.8%. Since then, personal consumption expenditures have declined quarter after quarter to a 2.4% change in the third quarter of 2022. (See Figure 11).

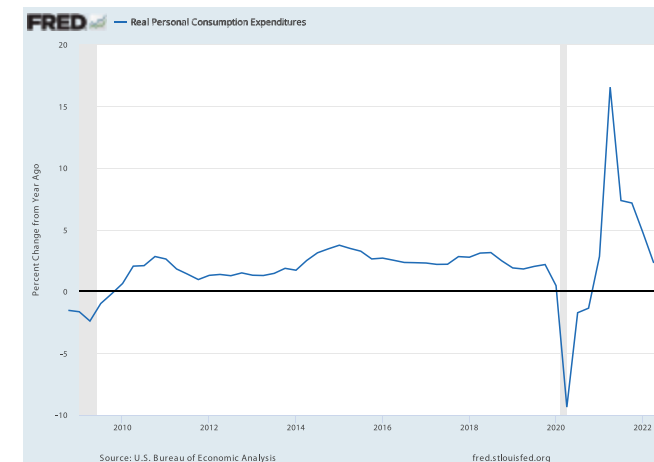


Figure 11 - Real personal consumption expenditures from Q1 of 2009 through Q3 of 2022. U.S. Bureau of Economic Analysis, Real Personal Consumption Expenditures [OB000349Q], retrieved from FRED, Federal Reserve Bank of St. Louis

The unemployment rate in the U.S. was 3.7% in October 2022 and had been hovering around 3.5% since March 2022 after gradually declining from a high level of 14.7% in April 2020 caused by COVID-19. For the six months preceding the outbreak of COVID-19, the employment rate was running at 3.5% and at that time, was a 50-year record low rate of inflation. (See Figure 12). The Biden Administration is credited with adding more jobs within a one-year period of time (6.6 million

jobs) than any other administration. However, this follows the extremely high unemployment rate caused by COVID-19. Although consumer sentiment is down, low unemployment and more people making money can contribute favorably to the overall economy.

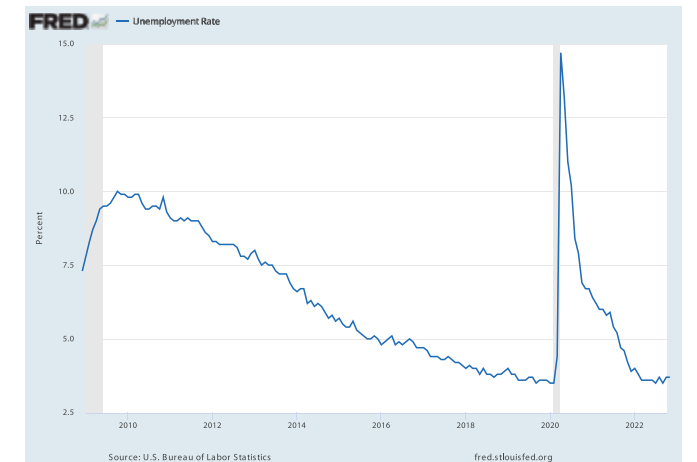


Figure 12 - Unemployment rate from January 2009 through October 2022. U.S. Bureau of Labor Statistics, Unemployment Rate [UNRATE], retrieved from FRED, Federal Reserve Bank of St. Louis

Manufacturing

For all of manufacturing in the U.S., capacity utilization hit 79.62% in October 2022 after a mild decline from 80.10% in April 2022. Both numbers exceed capacity utilization levels since post the 2008-2009 recession are the highest since mid-2000. Immediately prior to COVID-19, capacity utilization was 76.86% and plummeted sharply to 62.32% in April 2020, after which a fairly quick recovery to above 75% had taken place by the end of 2020. Then it continued to climb. (See Figure 13). For most businesses, a capacity utilization of 85% is considered ideal and the current level for all of manufacturing is approaching this level.

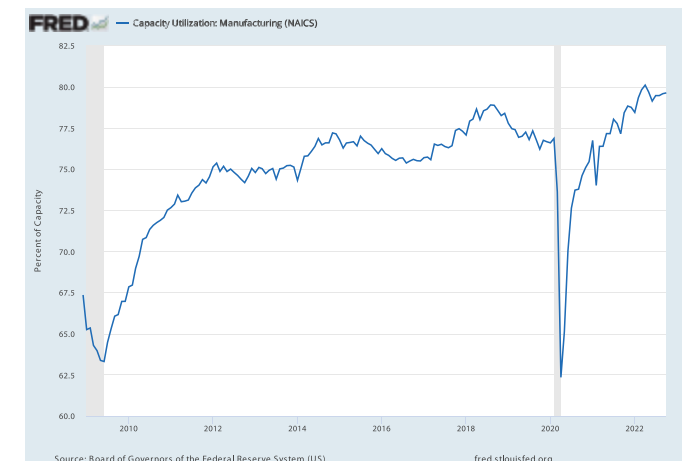


Figure 13 - Capacity utilization for all of Manufacturing from January 2009 through October 2022. Board of Governors of the Federal Reserve System (US), Capacity Utilization: Manufacturing (NAICS) [MCUMFN], retrieved from FRED, Federal Reserve Bank of St. Louis.

That being said about capacity utilization, according to the NAM (National Association of Manufacturers) Quarterly Survey Report for the third quarter of 2022 for all manufacturing, the business outlook has declined for the third quarter in a row to 75.6%. This number represents the percentage of company CEO's

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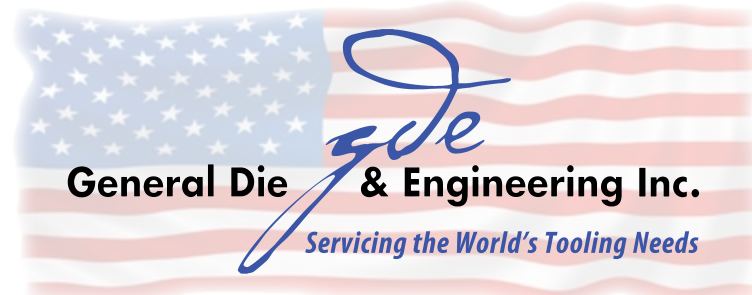
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that consider their current business outlook to be positive. The 75.6% level is the lowest since the fourth quarter of 2020. Since the beginning of 2021, the highest level of 90.1% was seen in the second quarter of 2021. The business outlook for the first and second quarter of 2022 was 88.8% and 82.6%, respectively. (See Figure 14).

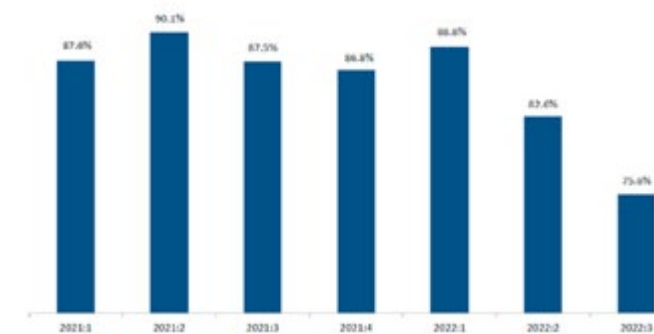


Figure 14 - Manufacturing Business Outlook from the NAM third quarter 2022 survey report.

NAM calculates a Manufacturing Outlook Index from the survey data that is collected. The Outlook Index is presented as an average value of all size companies and is also provided as an average of small, medium, and large size companies. From the first quarter of 2021 through the third quarter of 2022, the average index for all size companies had a high of 60 in the second quarter of 2021 and declined from about 58 in the first quarter of 2022, to 55 in the second quarter of 2022, to slightly above 50 in the third quarter of 2022. Large companies had the highest indexes in 2021 and medium-size companies had the highest indices in 2022. Small companies had the lowest indexes in both years. (See Figure 15).

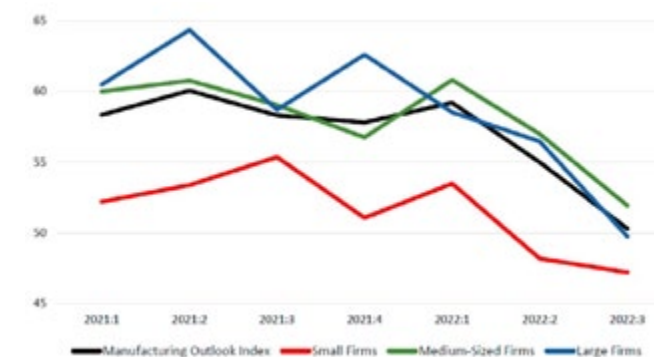


Figure 15 - NAM Manufacturing Outlook Index from the first quarter of 2021 through the third quarter of 2022.

Reasons for the decline in the Manufacturing Outlook Index include changes from the prior quarter and the challenges that companies are continuing to face. For instance, the expected growth rate for sales over the next 12 months declined from 4.6% in the second quarter to 3.3% in the third quarter of 2022 and the expected price increases for company products over the next 12 months fell from 5.9% in the second quarter to 3.9% in the third quarter of 2022. The expected growth rate in production over the next 12 months declined from 4.3% in the second quarter to 3.2% in the third quarter of 2022. Still positive growth rates but softened expectations in the third quarter.

Of the list of business challenges cited by manufacturing CEO's, the top three were: 1) supply chain challenges, cited by 78.3% of the respondents; 2) attracting and retaining a quality workforce, cited by 76.1% of the respondents; and, 3) increased raw material costs, cited by 76.1% of the respondents. (See Figure 16). These top three challenges were the same since the second quarter of 2021 although the order had changed slightly for some quarters. The constant fourth challenge since the first quarter of 2021 is that of transportation and logistics costs. The business challenges for all manufacturing according to the NAM Quarterly Survey Report is consistent with the challenges being faced by die casting industry.



Figure 16 - Top business challenges facing CEOs from the NAM third quarter 2022 survey report.

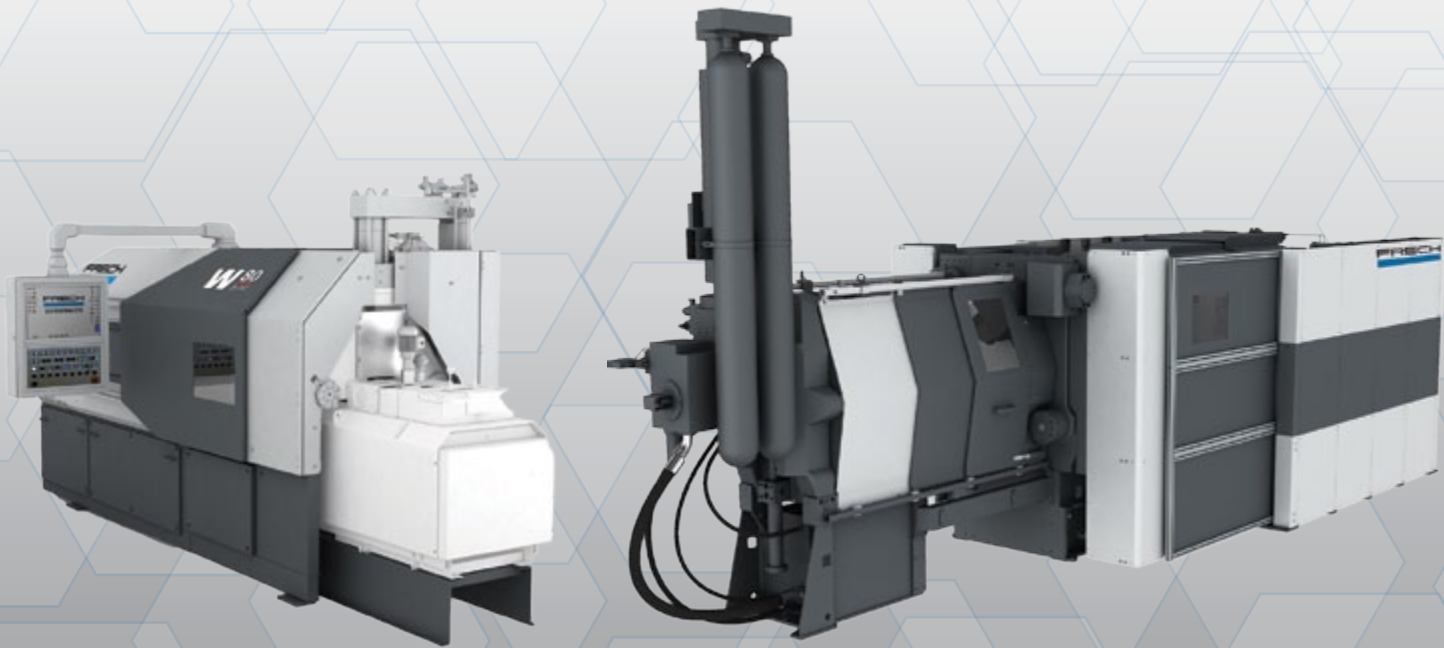
Die Casting Markets

Automotive remains as the largest end use industry/ market for die castings comprising of more than half of all die casting shipments. Housing is the second largest market for die castings at up to 13% of shipments when considering items such as lock, window and door hardware used for homes, home heating and cooling systems, plumbing fixtures for homes, major appliances, and lawn and garden equipment. Many other markets make up the remainder of shipments. These markets include sports and recreation, industrial equipment, electrical equipment and lighting, medical equipment, hand and power tools, telecommunication devices, computers and business equipment, plumbing, aerospace, robotics, and renewable energy systems. Sales information for the automotive industry and new housing starts are followed closely as these two markets drive the industry to the largest extent.

U. S. light vehicle sales (passenger cars and light trucks) in 2021 hit 14.9 million units. About 11.6 million units (78%) were light trucks and about 3.3 million units (22%) were passenger cars. The 14.9 million units is a slight 2.8% increase from 2020's 14.5 million units sold and only slightly less than the 15.0-15.3 projection from November 2021. Sales could have been higher and perhaps near 16.0 million, but supply was not able to meet demand. Not reaching the near 17.0 million units that were sold in 2019 and levels of some of the stellar years prior to COVID-19, 14.9 million units is still a fair level of sales. In January 2022, the SAAR of U.S. light vehicle sales was about 15.0 million and dropped to a low of about 13.5 million in May before climbing to a SAAR of 14.9 million in October. (See Figure 17). Sales in October increased due to more availability, providing buyers with more from which to

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choose, and moderation to price increases. The Wards Intelligence forecast for November 2022 is that monthly sales will soften slightly, and the SAAR will decline to 14.5 million units. (See Figure 18). Total sales for the year 2022 have been adjusted downward from the forecast one year ago and is expected to come in between 13.7-14.2 million units, about 5%-8% less than 2021. North American light vehicle production in 2022 has increased over 2021 and has been fairly solid even though not keeping up with demand because of supply chain issues. In September and October of 2022, for instance, production was up about 10% compared to the same time in 2021. (See Figure 19). At present, it appears that vehicle production will continue to increase in 2023 but may not hit pre-COVID-19 levels until late 2023. The sales forecast for 2023 has also been adjusted downward from a year ago and is now forecast to be 15.0-15.2 million units, however, still growth over 2022. Further growth is forecast for 2024. The automotive market is moving a positive direction.



Figure 17 - Monthly light vehicle sales and seasonally adjusted annual rate (SAAR) of sales from October 2021 to October of 2022.

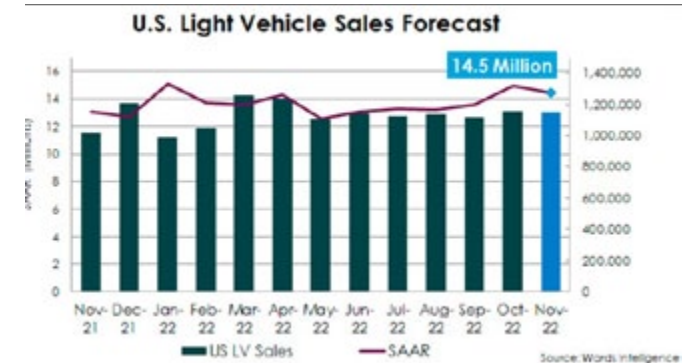


Figure 18 - Monthly light vehicle sales and seasonally adjusted annual rate (SAAR) of sales forecast for November 2022.

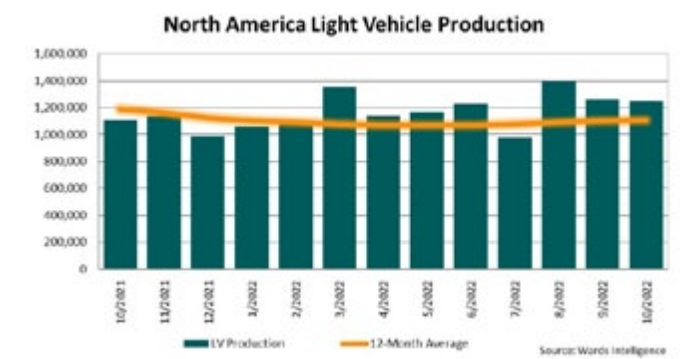


Figure 19 - Monthly light vehicle production from October 2021 to October 2022.

One may ask whether the automotive market is really moving in a positive direction for die casting with an increasing penetration of battery electric vehicles (BEV's) in the market. The short answer is yes. Based on a recent study conducted for NADCA by Ducker, battery electric vehicles are anticipated to grow from 4.2% in 2021 to only about 21% by 2028, barring any mandates. (See Figure 20). The weight of die castings in vehicles with internal combustion engines (ICE's) is greater than for BEV's but with the estimated steady growth in overall vehicle production and sales through 2028, the overall demand for die castings is forecast to increase through 2028 to 6.1%. Plus, there are still opportunities for die casting growth in BEV's.

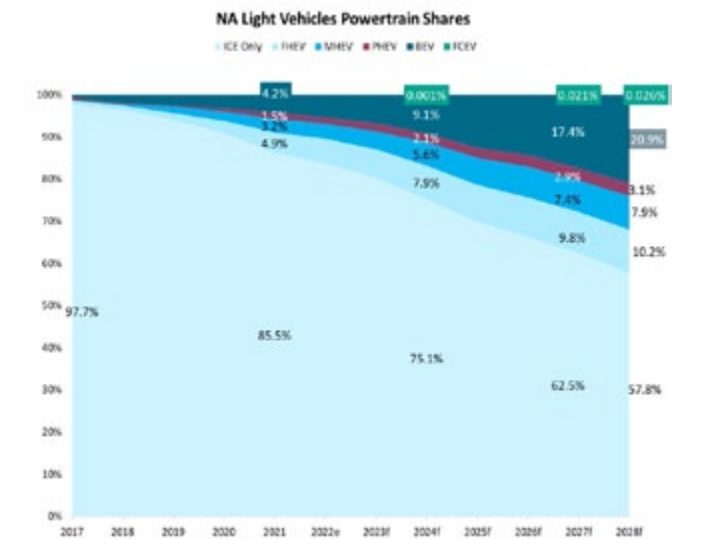


Figure 20 - Graph showing the penetration of battery electric vehicles (BEV's) and fuel cell electric vehicles (FCEV's) from 2017 through 2028. Source: Ducker and LMC Automotive Q4 2021.

It is interesting to note the impact the lack of new vehicle supply has had on the used car market. The greater, but still limited, availability of new vehicle inventory has caused prices of used cars to escalate. This in turn has been reducing the depreciation levels for some used cars and in some select models, 3-years-old vehicles are reportedly being sold at prices higher than above their initial brand-new value.

There were 1.60 million new privately-owned housing starts in the U.S. in 2021, up 16.0% from 1.38 million in 2020. Low mortgage interest rates contributed to this growth, but as interest rate hikes started coming into play and prices of materials continued to rise, the high SAAR for new privately-owned housing starts seen in January through April 2022 started to decline. The SAAR in April 2022 was 1.81 million starts and in October 2022 was 1.43 million starts. (See Figure 21). It is anticipated that housing starts will end at 1.37 million for 2022. This is still representative of a strong housing market even though it is a decline from 2021. New privately-owned housing starts in the U.S. is projected to trend around 1.50 million units in 2023 and 1.47 million units in 2024, according to econometric models. (See Figure 22). The current strong housing market and growth over 2022 projected for 2023 and 2024 is another positive for die casting.

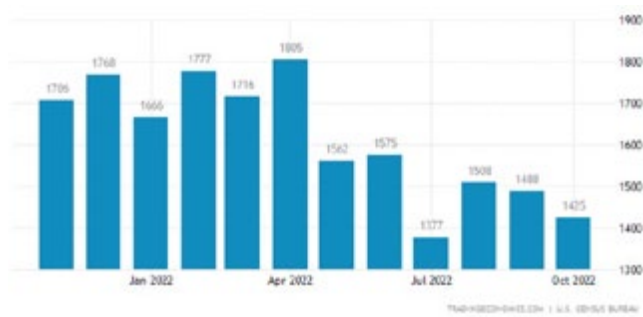


Figure 21 - Monthly Seasonally Adjusted Rate of Sales (SAAR) for new privately-owned housing starts from November 2021 to October 2022. From Trading Economics.

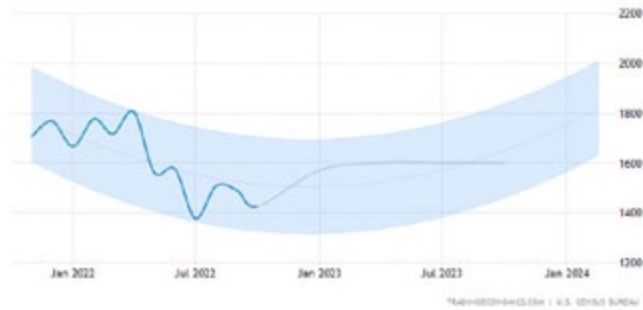


Figure 22 - Forecast for new privately-owned housing starts. From Trading Economics

Die Casting Shipments

The NADCA Quarterly Business Barometer Survey is conducted to assist in providing information on die casting shipments. Additionally, information on quoting activity, die builds, and capacity utilization is captured. Supplementing the shipment information on aluminum die castings is data from the Aluminum Association. For 2021, the Aluminum Association indicates that U.S. aluminum die casting shipments totaled 2.36 billion pounds. This is a 5.1% decline from aluminum die casting shipments in 2020 which totaled 2.48 billion pounds. Aluminum die casting shipments were 2.87 billion pounds in 2019 and 3.12 billion pounds in 2018. Zinc die casting shipments in 2021 were estimated to be about the same as shipments in 2020 which were an estimated 356 million pounds. Zinc die casting shipments in 2019 were an estimated 383 million pounds. Based on the third quarter 2022 Business Barometer results (the most recent results), overall shipments for 2022 are anticipated to be 8.4% higher than shipments in 2021. Aluminum die casting shipments are anticipated to be up 9.7%, zinc die casting shipments are expected to be down 5.8%, and magnesium die casting shipments are expected to be up 2.5%. Quarter over quarter, overall shipments were up 9.6% in the first quarter of 2022 compared to the fourth quarter of 2021, up 2.0% in the second quarter of 2022 compared to the first quarter of 2022, and down 1.4% in the third quarter of 2022 compared to the second quarter of 2022. (See Tables 2 and 3). Data for 2022 is not yet available from the Aluminum Association for comparison, however, based on the 2.36 billion pounds of aluminum die castings shipped in 2021 and considering the +9.7% forecast from the Business Barometer, aluminum die casting shipment may hit 2.59 billion pounds for 2022. With the increase in automotive production in 2022, even though sales softened in 2022,

this forecast appears to be reasonable. With zinc shipments forecast to be down 5.8%, the shipment level for 2022 may come in at 336 million pounds.

	Overall	Automotive	Non-Auto	Al	Zn	Mg
2022 Actual vs 2021						
2022 vs 2021 Forecast (Q3)	8.41%	7.00%	8.48%	9.69%	-5.77%	2.50%
2022 vs 2021 Forecast (Q2)	14.62%	19.68%	6.95%	15.50%	1.10%	17.00%
2022 vs 2021 Forecast (Q1)	11.44%	18.94%	7.79%	12.66%	5.86%	6.68%

Table 2 - Forecast of 2022 die casting shipments compared to 2021 die casting shipments as of the first, second and third quarter of 2022. From the NADCA Third Quarter 2021 Business Barometer.

	Overall	Automotive	Non-Auto	Al	Zn	Mg
4th Q'22 vs 3rd Q'22						
3rd Q'22 vs 2nd Q'22	-1.42%	-6.95%	-1.13%	-0.54%	-10.14%	-18.03%
2nd Q'22 vs 1st Q'22	2.01%	2.17%	1.76%	2.46%	-4.80%	28.21%
1st Q'22 vs 4th Q'21	9.59%	17.94%	5.84%	10.79%	5.50%	0.28%

Table 3 - Die casting shipment comparison by quarter. From the NADCA Third Quarter 2022 Business Barometer.

With the light vehicle sales expected to grow nominally about 8.3% and housing expected to grow about 9.5% in 2023, overall die casting shipments in 2023 are estimated to grow about 8.5% over 2022.

Per the results of the Business Barometer, capacity utilization in the third quarter of 2022 was an average of 62% overall for die casting. This compares to a capacity utilization of 79.6% in October 2022 for all of manufacturing. In the first quarter of 2022 the overall capacity utilization for die casting was an average of 63%, and in the second quarter of 2022 the overall capacity utilization was an average of 59% for die casting.

In the 3rd quarter of 2022, quoting new jobs was up 2.8% and new die builds were up 1.2% compared to the third quarter of 2021. (See Figures 23 and 24). Quoting activity and die builds being up compared to the prior year is consistent with the projected growth in 2023.

The die casting industry in North America is comprised of 395 die casting plants in the U.S., 47 plants in Canada, and an estimated 150 plants in Mexico.

Conclusions

The Biden Administration has had some key accomplishments and has made progress toward addressing some of the top priorities that were set going into the 2020 election and when President Biden took office. The American Rescue Act, Inflation Reduction



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How were new die builds in Q3 2022 compared to same time last year?

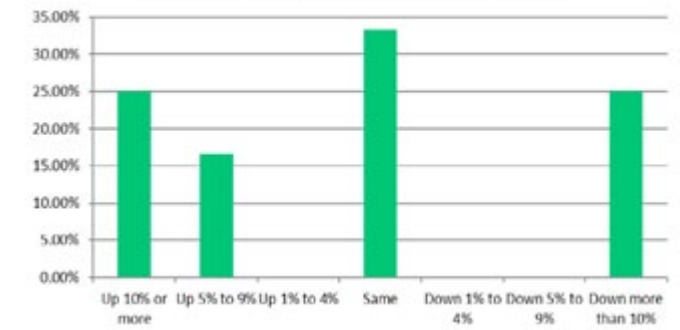


Figure 23 - Quoting of new jobs in the third quarter of 2022 versus the third quarter of 2021. Overall, quoting was up about 2.8% From the NADCA Third Quarter 2022 Business Barometer.

How was quoting new jobs in Q3 2022 compared to same time last year?

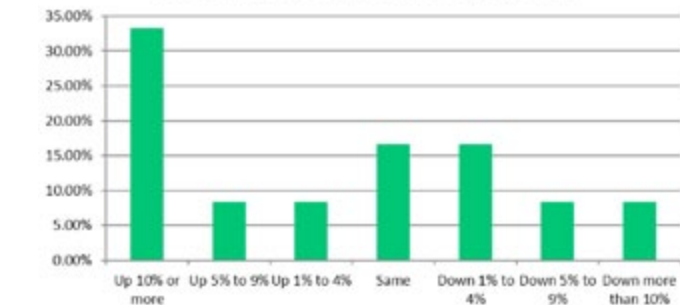


Figure 24 - New die builds in the third quarter of 2022 versus the 3rd quarter of 2021. Overall, die builds were up 1.2%. From the NADCA Third Quarter 2022 Business Barometer.

Act of 2022, CHIPS and Science Act, and Bipartisan Infrastructure Framework Bill were signed into law.

The current rate of inflation is well above targeted levels. Interest rates were hiked by the Federal Reserve in an attempt to curb inflation. Although this may be having an effect, there is concern that interest rates may have been hiked too high and too quickly. Both consumer sentiment and personal consumption expenditures have declined. These factors coupled with continued supply chain issues have negatively impacted GDP growth.

The Outlook Index for all of manufacturing has declined quarter over quarter in 2022 as businesses continue to be challenged with supply chain issues, attracting and retaining a quality workforce, and increased raw material costs. Light vehicle sales for 2022 are expected to be 13.7-14.2 million units and the forecast for 2023 is 15.0-15.2 million units. Further growth is forecast for 2024. New privately-owned housing starts are anticipated to be 1.37 million for 2022 and the forecast for 2023 and 2024 is 1.50 million and 1.47 million, respectively.

Die casting shipments in 2022 are anticipated to be 8.4% greater than 2021. The forecast for diecasting shipments in 2023, based on sales trends in major markets, is a growth of 8.5% percent over 2022 and to near pre-COVID-19 levels.



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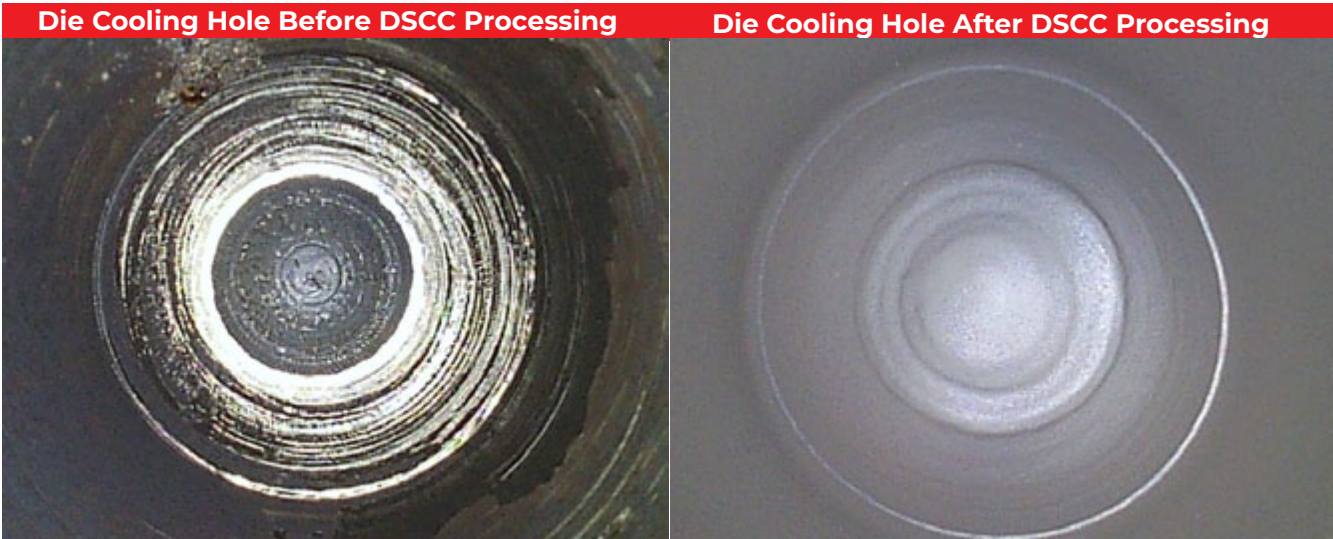
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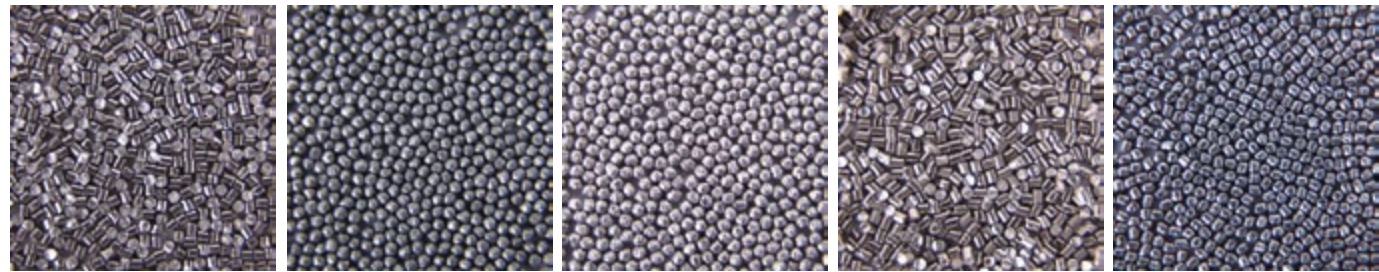
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Blanford	Joe	Riteway Machining Inc.	Leitchfield	(517) 589-0535	ritewaymachining@msn.com
Bodfish	Andrew	Cascade Die Casting Group Great Lakes	Sparta	(616) 887-1771	abodfish@cascade-cdc.com
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Carpenter	Christopher		Kalamazoo		ccarpenter7289@charter.net
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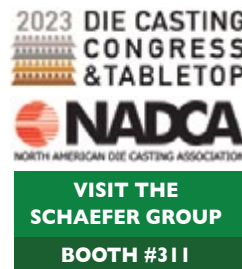
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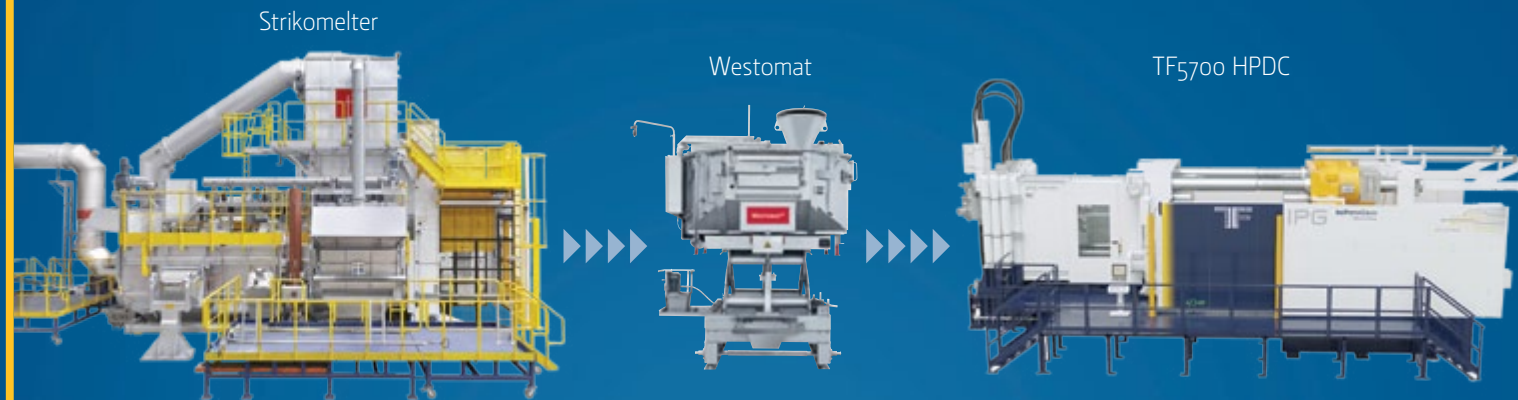


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Drake	Chuck	Chem-Trend LP	Ormond Beach	(517) 546-4520	cdrake@chemtrend.com
Dukic	Joseph	DieKast Inc.	Holland		sales@diekast.com
Dunneback	Jamie		Farmington Hills		jdunneback@star-su.com
Easlick	Jason	Martinrea	Lake Orion		jason.easlick@martinrea.com
Eaton	James	B&L Information Systems Inc.	Cassopolis	(269) 465-6207	jeaton@blinfo.com
Eblen	David	L K Machinery Inc.	Edinburgh	(616) 796-0777	david.eblen@lk.world
Eckert	Christian	Regloplas Corporation	Saint Joseph	(888) 799-4110	c.eckert@regloplas.com
Ellison	Eric	South Haven Finishing Inc.	South Haven	(269) 637-2047	andy@southhavenfinishing.com
Emmenegger	Johann	Fondarex USA	Schoolcraft	(269) 679-7164	jan.emmenegger@fondarex.com
Engleman	Tim	Chrysler World Headquarters and Technology Center	Auburn Hills	(800) 334-9200	timothy.engleman@stellantis.com
Epler	Loren	Dynamic Surface Technologies	Canton	(734) 459-8022	lepler@dynablue.com
Eppich	Robert	Eppich Technologies	Syracuse	(574) 457-2701	eppichtec@earthlink.net
Ernvall	Eric		Brooklyn		eernvall@gmail.com
Essex	B. John	Port City Ventures	Muskegon		jessex@portcityventures.com
Farley	Allen	Cascade Die Casting Group - Mid-State	Grand Rapids	(616) 455-4010	afarley@cascade-cdc.com
Farver	Bradley	Michigan Die Casting LLC	Dowagiac	(269) 462-4011	bfarver@michigandiecasting.com
Faupel	Thomas	Meridian Technologies Inc. Magnesium Products of America	Eaton Rapids	(517) 663-2700	tfaupel@meridian-mag.com
Fazekas	Stephen	Cascade Die Casting Group Services/Corporate Headquarters	Grand Rapids	(616) 281-1660	sfazekas@cascade-cdc.com
Feather	Mike	Hanson International	Saint Joseph	(269) 429-5555	mfeather@hansonmold.com
Filosena	Kyle	Innovation Central High School	Grand Rapids		filosenak@gmail.com
Fisher	Jason	Hanson International	Saint Joseph	(269) 429-5555	jfisher@hansonmold.com
Flickinger	William	YIZUMI-HPM Corporation	Iberia	(740) 382-5600	flickinger@hpmachinery.com
Florian	Dan	Hanson International	Saint Joseph	(269) 429-5555	dflorian@hansonmold.com
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Frakes	Thomas	Shawnee Specialties Inc.	Eau Claire	(269) 461-6931	tfrakes@shawneeinc.com
Frank	Mark	North Shore Manufacturing Corporation	Coloma	(269) 849-2551	mfrank@nshoremfg.com
Fratgillo	Nick	Dwyer Instruments Inc.	La Porte	(219) 393-5851	nfratgillo@dwyermail.com
Fredbloom	Mike	Sinto America	Grand Ledge	(517) 371-2460	mike.fredbloom@sintoamerica.com
Fuller	Albert		Lewisburg		al.fuller@outlook.com
Gajaria	Jitatman		Kalamazoo		jitatman1@gmail.com
Genovese	Alex	West Michigan Tool & Die	Benton Harbor	(269) 925-0900	agenovese@wmted.com
Gibson	Kevin	Wilkast Inc.	Grand Rapids	(616) 281-2850	kevin@wilkast.com
Goetz	Christian	Geff LP	Grand Rapids		christian.goetz@geff.us
Gonzalez	Alain	BuhlerPrince Inc.	Holland	(616) 394-8248	alain.gonzalez@buhlergroup.com
Goode	John	Wollin USA	Plymouth	(800) 245-9232	john_goode@wollinusa.com
Gorman	Charles	Sinto America	Grand Ledge	(517) 371-2460	charlie.gorman@sintoamerica.com
Grajeda	Cesar	Pace Industries, Corporate Headquarters	Novi	1-888-DIE-CAST	cesar.grajeda@paceind.com
Gray	Tom	DieTech & Engineering Inc.	Grand Rapids	(616) 530-9030	t.gray@dietech-gr.com
Grbic	Bob	Pace Industries, Corporate Headquarters	Novi	1-888-DIE-CAST	bob.grbic@paceind.com
Greene	Patrick	Cascade Die Casting Group Group Services/Corporate Headquarters	Grand Rapids	(616) 281-1660	pgreene@cascade-cdc.com
Greer	David	Meridian Lightweight Technologies Corporate Head Office	Plymouth	(734) 416-8600	dgreer@meridiansales.com
Grimm	Matt	Frech USA	Michigan City	(219) 874-2812	mgrimm@frechusa.com
Groth	Ron	M & I Machine	Benton Harbor	(269) 849-3624	info@shotendtooling.com
Grutter	Matthew		Rockford		mattgrutter@gmail.com
Guaresimo	David	AAM - American Axle & Manufacturing	Detroit	(313) 758-2000	david.guaresimo@aam.com
Guthrie	Brad	BOHLER	Lake Worth	(888) 368-3376	brad.guthrie.ext@edro.com
Guzman	Pete	BuhlerPrince Inc.	Holland	(616) 394-8214	pete.guzman@buhlergroup.com
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Halladay	John	Godfrey & Wing Inc.	Aurora	(800) 241-2579	jhalladay@godfreywing.com
Halpin	Tom	Diehl Tool Steel	Grosse Pointe	(800) 543-1566	th@titangroupna.com
Hamell	Mike	Sun Steel Treating Inc.	South Lyon	(877) 471-0840	mhamell@sunsteeltreating.com
Hardesty	Rodney	Titus Group / Titus Technologies	Columbia City	(425) 746-2080	rodney.hardesty@titusplus.com
Harmon	Kendra	Sinto America	Grand Ledge	(517) 371-2460	kendra.harmon@sintoamerica.com
Head	Paul	AAM - American Axle & Manufacturing	Detroit	(313) 758-2000	paul.head@aam.com
Herman	Edmund	Creative Concepts Co Inc.	Shelby Township	(586) 247-4360	edmundaherman@comcast.net
Herrmann	Rainer	Herco LLC	Auburn Hills	(248) 778-5119	rainer.herrmann@hercocast.com
Hewett	Spenser	Auto Cast Inc.	Grandville	(616) 534-4941	shewett@autocastinc.com
Hildreth	Terry	Hildreth Manufacturing LLC	Marion	(740) 375-5832	t.hildreth@hildrethmfg.com
Hines	Jeff	Hanson International	Saint Joseph	(269) 429-5555	jhines@hansonmold.com
Hoelt	John	Wollin USA	Plymouth	(800) 245-9232	john_hoelt@wollinusa.com
Hohman	Ted	Cascade Die Casting Group Inc. Group Services/Corporate Headquarters	Grand Rapids	(616) 281-1660 x107	thohman@cascade-cdc.com
Holland	Ronald		Gowen		hollander0.rh@gmail.com
Host	James	Plibrico Company	South Bend	(312) 455-0140	redlineind@comcast.net
Hultman	Paul	Century Sun Metal Treating	Traverse City	(231) 941-7800	phultman@centinc.com
Hurley	Lourie	Cascade Die Casting Group Great Lakes	Sparta	(616) 887-1771	lhurley@cascade-cdc.com
Ikerd	Trevor	Auto Cast Inc.	Grandville	(616) 534-4941	trevori@autocastinc.com
Ikerd	Todd	Auto Cast Inc.	Grandville	(616) 534-4941	tikerd@autocastinc.com
Jacobson	Steve	BuhlerPrince Inc.	Holland	(616) 394-8248	steve.jacobson@buhlergroup.com
Jacques	Richard		Battle Creek		rjacques37@aol.com
Jaeger	Derek	Heartland Castings Inc.	Waterloo	(260) 837-8311	jordan@heartlandcastings.com
Jakubiak	Brad	StrikoWestofen America	Macomb	(616) 772-3705	brad.jakubiak@noricangroup.com
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Joachim	Ralf	Standard Tool & Die	Baroda	(269) 465-6004	ralfj@standardtool.net
Johnson	Dean	Birch Machinery Co.	Birch Run	(989) 624-9371	deanjohnson9@aol.com
Jones	Jerry	Michigan Automotive Compressor Inc.	Parma	(517) 622-7000	jonesj@michauto.com
Jose	Sarah	Pace Industries, Corporate Headquarters	Novi	1-888-DIE-CAST	sarah.jose@paceind.com
Karban	Robert		Harrison Township		
Kempowski	Steve	Lindberg MPH	Riverside	(262) 642-6067	skempowski@wisoven.com
Kern	Matthew	G&K Associates	Troy	(248) 227-5511	mkern@gkasales.com
Kilgus	Todd	Centracore De Mexico	Saint Clair	(586) 776-5500	tkilgus@centracore.com
Kim	Chung-Whee	EKK Inc.	Farmington Hills	(248) 624-9957	kim@ekkin.com
King	Jeff	Pyrotek Inc.	Columbia City	(260) 248-4002 x203	jefkin@pyrotek.com
King	Larry	TAC Manufacturing Incorporated	Jackson	(517) 789-7000	lking@tramgroup.com
Kirkman	Jonathan	Die Therm Engineering LLC Grand Rapids, MI	Ada	(616) 822-4016	skirkman@dietherm.com
Kitson	Courtney	Auto Cast Inc.	Grandville	(616) 534-4941	ckitson@autocastinc.com
Kline	Kory	PCS Company	Fraser	(800) 521-0546	ksk@pcs-company.com
Koetje	John	Cascade Die Casting Group Group Services/Corporate Headquarters	Grand Rapids	(616) 281-1660	jkoetje@cascade-cdc.com
Kok	Nicolas	Wilkast Inc.	Grand Rapids	(616) 281-2850	nyckkok@yahoo.com
Kozachik	Melina		Nobleton		
Kramer	Mark	TAC Manufacturing Incorporated	Jackson	(517) 789-7000	mkramer@tramgroup.com
Kroes	Tyler	Martinrea International	Auburn Hills		tyler.kroes@martinrea.com
Kukulis	Charles	General Die & Engineering Inc.	Grand Rapids	(616) 698-6961	ckukulis@gendie.com
Kuno	Tatsuya	Roberts Sinto Corporation	Grand Ledge		tatsuya.kuno@sintoamerica.com
Kwiek	David	General Die & Engineering Inc. Grand Rapids, MI	Grand Rapids	(616) 698-6961	dave.kwiek@gendie.com
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Landon	Jessica	Meridian Lightweight Technologies Corporate Head Office	Plymouth	(734) 416-8600	jlandon@meridian-mag.com
Laney	Philip	B&L Information Systems Inc.	Bridgman	(269) 465-6207	planey@blinfo.com
Lapierre	Craig	Precision Die Cast Inc.	Kimball	(810) 294-5170	craig@precisiondiecast.com
Larson	Louis	New Products Corporation	Benton Harbor	(269) 925-2161	louis.larson@newproductscorp.com
Lavanway	Julie	Hanson International	Saint Joseph	(269) 429-5555	jlavanway@hansonmold.com
Layton	Fred	West Michigan Tool & Die	Benton Harbor	(269) 925-0900	flayton@wmtd.com
Leal	Rick	Dynamic Surface Technologies	Lexington	(734) 459-8022	rleal@dynablue.com
Leal	Oscar	Pace Industries, Corporate Headquarters	Novi	1-888-DIE-CAST	oscar.leal@paceind.com
Lee	Robert	BuhlerPrince Inc.	Holland	(616) 394-8248	robert.lee@buhlergroup.com
Lehmann	Bruno	TRU Die Cast Corp	New Troy	(269) 426-3361	bruno@trudiecast.com
Lemke	Harald	Mac Lean Additive	Sterling Heights	(401) 601-4400	hlemke@macleanfogg.com
Lewis	Rob	TRU Die Cast Corporation	New Troy	(269) 426-3361	rob_lewis@trudiecast.com
Li	Mei	Ford Motor Company - Rawsonville Plant	Bloomfield Hills	(734) 523-3000	mli9@ford.com
Liggett	Brian	Hanson International	Saint Joseph	(269) 429-5555	bliggett@hansonmold.com
Lindsay	David	Oerlikon Balzers Coating USA Inc.	Wixom	(248) 960-9055	david.lindsay@oerlikon.com
Lisinski	Nancy	Industrial Innovations Inc.	Grandville	(616) 249-1525	nlesinski@industry-scope.com
Lockman	Steve	D&F Mold LLC	Bridgman	(269) 465-6633	slockman@dnfmold.com
Los	Mark	BuhlerPrince Inc.	Holland	(616) 394-8248	mark.los@buhlerprince.com
Los	Jason		Holland	(616) 394-8248	jason.los@hey.com
Lowe	Edwin	Hoffmann Die Cast LLC	St. Joseph	(269) 983-1102	elowe@hoffmannndc.com
Lynn	Stephen	General Motors Corporation R&D Technical Center	Warren	(248) 606-4886	stephen.lynn@gm.com
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Maj	Michael	Minth North America	Livonia		michael.maj@minthgroup.com
Marek	David	Kentwater Tool & Manufacturing Co.	Comstock Park		dave@kentwatertool.com
Maria-Pillai	Nandhaku- maran	Cosma Casting Michigan Cosma International, Magna International	PORTAGE	(269) 966-4900	nandha.mariapillai@magna.com
Martin	Michael	Hauzer Techno Coating LLC	Troy	(248) 571-2689	michaelmartinmm@comcast.net
Mason	William		Bellevue		wjv3934@wmich.edu
Matsumoto	Takashi	UBE Machinery Inc.	Ann Arbor	(734) 741-7000	tmatsumoto@ubemachinery.com
Maurer	Colton	Southern New Hampshire University	Stevensville		cmaurer0511@gmail.com
McCallum	Brandon	Pace Industries, Corporate Headquarters	Novi	1-888-DIE-CAST	brandon.mccallum@paceind.com
McClintic	Robert	Bob McClintic & Associates	Grand Rapids	(616) 292-0454	rmcclintic@ameritech.net
McCrevan	Patrick	B&L Information Systems Inc.	Bridgman	(269) 465-6207	pmccrean@blinfo.com
McInerney	Robert	RJMII	Holland	(616) 251-8923	robmcinerney@chartermi.net
McKeough	Bryan	Ford Motor Company	Macomb	(734) 536-4319	bmckeoug@ford.com
Mees	Aaron	TAC Manufacturing Incorporated	Jackson	(517) 789-7000	amees@tramgroup.com
Mendoza	Christian	Pace Industries, Corporate Headquarters	Novi	1-888-DIE-CAST	christian.mendoza@paceind.com
Miller	Doug	Chem-Trend LP	Newnan	(517) 546-4520	dmiller@chemtrend.com
Miller	David	Ionbond Coatings	Madison Heights		david.miller@ionbond.com
Mitra	Rish	AAM - American Axle & Manufacturing	Detroit	(313) 758-2000	saptarshi.mitra@aam.com
Monroe	Troy	General Die & Engineering Inc.	Grand Rapids		troy.monroe@gendie.com
Moran	Jim	Cascade Die Casting Group Inc. Group Services/Corporate Headquarters	Grand Rapids	(616) 281-1660	jmoran@cascade-cdc.com
Mowatt	Victor	West Michigan Tool & Die	Benton Harbor	(269) 925-0900	vmowatt@wmtd.com
Mulder	John	Master Finish Co.	Grand Rapids	(616) 245-1228	jmulder@masterfinishco.com
Muller	Gustavo	Pace Industries, Corporate Headquarters	Novi	1-888-DIE-CAST	gustavo.muller@paceind.com
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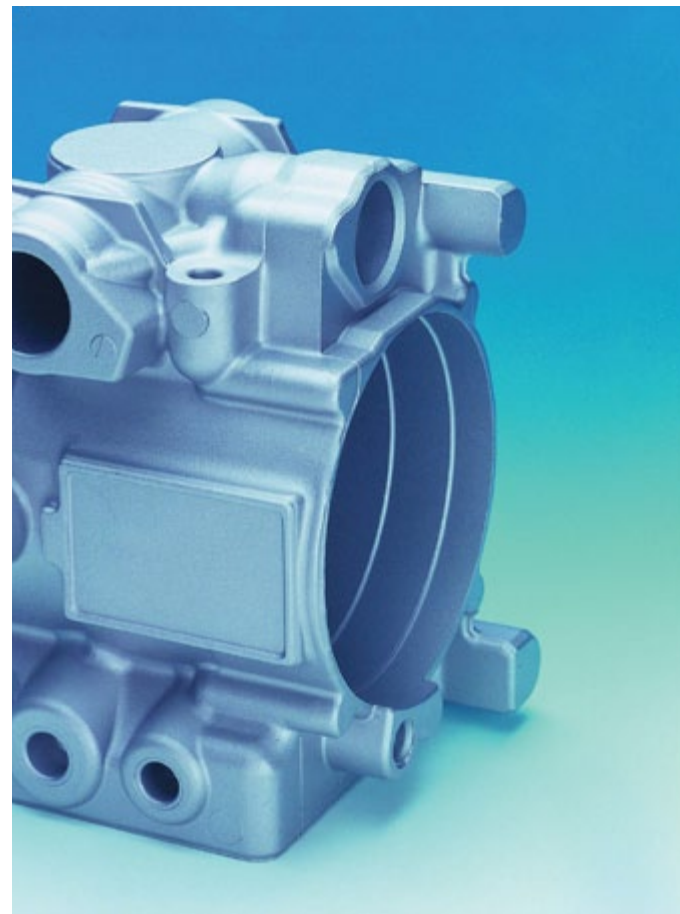
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O’Ryan	Charlie	StrikoWestofen America	Northampton	(616) 772-3705	charlie.oryan@noricangroup.com
O’Ryan	David	Ecoclean Group	Southfield		david.oryan@ecoclean-group.net
Osslelaer	Bryan	Superior Aluminum Alloys	New Haven		bosselaer@saalloys.com
Ously	Dusty	Pyrotek Inc.	Columbia City	(866) 797-6835	dusous@pyrotek.com
Owens	Melissa	BuhlerPrince Inc.	Holland	(616) 394-8248	melissa.owens@buhlergroup.com
Panvini	Andrea	PiQ2	25123 BRESCIA	+39 030 6595058	a.panvini@piq2.com
Parker	Kellie	Chem-Trend LP	Howell	(517) 546-4520	kparker@chemtrend.com
Perkins	Kathy	BuhlerPrince Inc.	Holland	(616) 394-8248	kathy.perkins@buhlerprince.com
Petraska	Leisa	Meridian Lightweight Technologies Corporate Head Office	Plymouth	(734) 416-8600	lpetraska@meridiansales.com
Petrillo	Joe	Meridian Lightweight Technologies Corporate Head Office	Plymouth	(734) 416-8600	jpetrillo@meridiansales.com
Pienta	Jeffrey	TAC Manufacturing Incorporated	Jackson	(517) 789-7000	jpienta@tramgroup.com
Platte	Curtis	BuhlerPrince Inc.	Holland	(616) 394-8248	curtis.platte@buhlergroup.com
Porter	Michael	BuhlerPrince Inc.	Holland	(616) 394-8248	michaeljporter@comcast.net
Prevost	Sean	Innovation Central High School	Grand Rapids		seanmjprevost@gmail.com
Probert	Benjamin	Cosma Casting Michigan Cosma International, Magna International	Battle Creek	(269) 966-4900	ben.probert@magna.com
Prucha	Thomas	MetalMorphasis LLC	Rochester	(810) 423-7564	tprucha@sbcglobal.net
Purcell	Matthew	Cascade Die Casting Group Group Services/Corporate Headquarters	Grand Rapids		mpurcell@cascade-cdc.com
Quintana	Luis	BuhlerPrince Inc.	Holland	(616) 394-8248	luis.quintana@buhlergroup.com
Quirk	Steven	Cascade Die Casting Group Great Lakes	Sparta	(616) 887-1771	squirk@cascade-cdc.com
Ramesh	Abhiram	Chrysler World Headquarters and Technology Center	Auburn Hills	(800) 334-9200	abhiram.ramesh@stellantis.com
Ramos	Carlos	Chrysler World Headquarters and Technology Center	Shelby Township	(800) 334-9200	carlos.ramos2@stellantis.com
Raymond	Rachel	EKK Inc.	Farmington Hills	(248) 624-9957	rachelr@ekking.com
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Reeves	Martin	Fontec-Global LLC	Holland	(636) 327-5777	reeves2013m@gmail.com
Reifschneider	Daniel	Accu Die & Mold Inc.	Stevensville	(269) 465-4020	danr@accu-die.com
Remler	Robert	Ultraseal America Inc.	Long Grove	(734) 945-7210	bremler@ultrasealamerica.com
Ried	Peter	Ried and Associates LLC	Portage	(269) 327-3097	pried_imagineer@netzero.net
Rikkers	Steve	Allied Mineral Products	Sparta	(614) 876-0244	steve.rikkers@alliedmin.com
Risetter	David	Shawnee Specialties Inc.	Eau Claire	(269) 461-6931	drisetter@shawneeinc.com
Roborecki	Jacob	AAM - American Axle & Manufacturing	Detroit	(313) 758-2000	jacob.roborecki@aam.com
Roell	Steve	Pace Industries, Corporate Headquarters	Novi	1-888-DIE-CAST	steve.roell@paceind.com
Rook	Dennis	Benton Metal Recycling	Benton Harbor	(269) 926-1161	dennis@bentonmetals.com
Rookus	Tom	BuhlerPrince Inc.	Holland	(616) 394-8230	tom.rookus@buhlerprince.com
Rose	Sheila	TRU Die Cast Corporation	New Troy	(269) 426-3361	sheila@trudiecast.com
Rovere	Massimo	Cosma Casting Michigan Cosma International, Magna International	Battle Creek	(269) 966-4900	massimo.rovere@magna.com
Rozema	Phil	BuhlerPrince Inc.	Holland	(616) 394-8248	phil.rozema@buhlerprince.com
Rudnik	Paul	Plansee USA LLC	Saline		paul.rudnik@plansee.com
Sarver	Matt		Caledonia		mattsarver80@gmail.com
Schackemy	Steve	Fondarex USA	Schoolcraft	(269) 679-7164	steve.schackemy@fondarex.com
Scharpe	Thomas	Henkel Corporation	Cape Coral	(866) 332-7024	thomas.scharpe@henkel.com
Scholtens	Harry	Laserax	Holly	(418) 780-7324	hscholtens@laserax.com
Schroeder	Chad	Mag-Tec Casting	Jackson		chad@mag-teccasting.com
Schroeder	Allen	Mag-Tec Casting Corporation	Jackson	(517) 789-8505	allen@mag-teccasting.com
Schroeder	Matthew	Mag-Tec Casting Corporation	Jackson	(517) 789-8505	matt@mag-teccasting.com
Scott	Sam	Industrial Innovations Inc.	Grandville	(616) 214-3036	sscott@industrialinnovations.com
Seaver	Sean	MillerKnoll	Zeeland	(616) 654-5681	sean_seaver@hermanmiller.com

MEMBERSHIP ROSTER

2023 - 2024

Last	First	Company	City	Phone	Email
Selan	Gerald	Hildreth Manufacturing LLC	Marion	(740) 375-5832	g.selan@hildrethmfg.com
Settineri	Samuel	Eaton	Marshall		samuelseuttineri@eaton.com
Sexton	Dale	New GLDC LLC	Muskegon	(231) 726-4002	dsexton@gldiecast.com
Sholapurwalla	Adi	ESI Group North America	Farmington Hills	(248) 381-8040	adi@esi-group.com
Shreve	Michelle	Shawnee Specialties Inc.	Eau Claire	(269) 461-6931	mshreve@shawneeinc.com
Siko	Chrissy	Pace Industries, Corporate Headquarters	Novi	1-888-DIE-CAST	chrissy.siko@paceind.com
Silva	Rene	ItalPresseGauss	Lagrange	(616) 772-3705	rene.silva@noricangroup.com
Simmons	Scott	Henkel Corporation Adhesives Technologies	Madison Heights	(866) 332-7024	scott.simmons@henkel.com
Smidt	Ronald	Die Cast Press Manufacturing Co.	Paw Paw	(269) 657-6060	ron@diecastpress.com
Smith	Kevin	AAM - American Axle & Manufacturing	Detroit	(313) 758-2000	kevin.smith@aam.com
Smith	Ryan	Aludyne - Auburn Plant	Auburn	(260) 925-4711	ryanmsmith4116@gmail.com
Smith	David	Auto Cast Inc.	Grandville		dsmith@autocastinc.com
Smith	Ryan	BuhlerPrince Inc.	Holland	(616) 394-8248	ryan1.smith@buhlergroup.com
Smith	Kennith	Die Cast Press Manufacturing Co.	Paw Paw	(269) 657-6060	ken@diecastpress.com
Smith	Robert	JudCo Manufacturing	Walled Lake	(313) 489-0770	
Smith	Andy	Sun Steel Treating Inc.	South Lyon	(877) 471-0840	asmith@sunsteeltreating.com
Snyder	Michael	Midwest Prod Spec Inc.	Muskegon	(231) 767-9942	mpsi-muskegon@hotmail.com
Song	Charles	Sunocs LLC	Valparaiso	(732) 686-6197	csong@sunocs.com
Spearritt	Todd	Quality Mold & Engineering Inc.	Baroda	(269) 422-2137	tspearritt@quality-molds.com
Spierenburg	Steve	BuhlerPrince Inc.	Holland		steve.spierenburg@buhlerprince.com
Stargel	Lance	Honda Development Manufacturing of America - Alabama Auto Plant - ALDC	Lincoln	(205) 355-5000	lance_stargel@na.honda.com
Starook	Matthew		Grand Haven		gtx18@sbcglobal.net
Tagliabue	Giorgio	Brondolin North America	Benton Harbor	(269) 208-3867	william.tagliabue@brondolin.it
Terry	Chris	ACE Precision International LLC	Saint Joseph	(641) 753-6520	cterry@intl-ace.com

Last	First	Company	City	Phone	Email
Thomas	Tim	Michigan Automotive Compressor Inc.	Parma	(517) 622-7000	thomast@michauto.com
Thompson	Beth	DME Company	Madison Heights	(248) 544-5748	beth_thompson@dme.net
Torres	Enrique	BuhlerPrince Inc.	Holland	(616) 394-8248	enrique.torres@buhlergroup.com
Torrey	Donald	Hill and Griffith Company	Saint Joseph	(513) 921-1075	dtorrey13@comcast.net
Trejo	Eduardo	Eaton	Galesburg		eduardotrejoescalona@eaton.com
Udvardy	Stephen	NADCA	North Liberty	(847) 808-3163	udvardy@diecasting.org
Van Slambrouck	John	Century Sun Metal Treating	Hudsonville	(800) 800-5806	jvanslambrouck@centinc.com
VanDyken	Chad	BuhlerPrince Inc.	Holland	(616) 394-8248	chad.vandyken@buhlergroup.com
Vas	Chris	Dwyer Instruments Inc.	La Porte	(219) 879-8868	cvas@dwyermail.com
Veenstra	Jon	Castool Tooling Systems	Uxbridge	(905) 852-0121	jon.veenstra@castool.com
Vosburgh	Kurt	Wollin USA	Plymouth	(800) 245-9232	kurt_vosburgh@wollinusa.com
Wadas	David	Eaton Cummins	Galesburg	(269) 342-3507	davidlwadas@eaton.com
Wallace	Randy	Ritchey Metals Company Inc.	Angola	(260) 668-3407	randy.wallace@midwestmetalexchange.com
Walters	Jeff	Frech USA	Michigan City	(219) 874-2812	jwalters@frechusa.com
Wanders	Debra	Die Cast Press Manufacturing Co.	Paw Paw	(269) 657-6060	debra@diecastpress.com
Wang	Yucong	General Motors Corporation R&D Technical Center	Warren	(248) 606-4886	yucong.wang@gm.com
Warner	Mark	Auto Cast Inc.	Grandville	(616) 534-4941	mwarner@autocastinc.com
Warner	Jeff	BuhlerPrince Inc.	Holland	(616) 394-8248	jeff.warner@buhlerprince.com
Warnick	Keith	JKW International LLC	Ferndale	(248) 881-6836	keith@keithwarnick.com
Wawrzyniak	William	Precision Die Cast Inc.	Kimball	(810) 294-5170	bill@precisiondiecast.com
Weich	Heath	Hanson International	Saint Joseph	(269) 429-5555	hweich@hansonmold.com
Weiler	Jonathan	Meridian Lightweight Technologies Inc. Global Technology Center	Strathroy	(519) 246-9600	jweiler@meridian-mag.com
Weiss	Mark	Metropolitan Alloys Corporation	Detroit		mweiss@metroalloys.com
Weston	Michael	Michigan Die Casting LLC	Dowagiac	(269) 471-7715	mweston@michigandiecasting.com



Cortney VanOeffelen
President

Cell: 616-291-2497
cortney@vanhyd.com

25 Gooding Road • Conklin, Michigan 49403
Ph: 800-884-1014 • Office: 616-887-3337 • Fax: 616-887-3334
www.VanHyd.com

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<http://www.dr diecast.com/die casting consulting services.htm>

Multi-slide to 4,000 ton

Bob McClintic, Owner/Consultant
523 Lincoln Lawns Dr NW
Grand Rapids, Michigan 49534

Cell: 616-292-0454

E-mail: RMcClintic@DrDieCast.com



LinkedIn Profile: <http://www.linkedin.com/in/bmclinticdiecast>

MEMBERSHIP ROSTER

2023 - 2024

Last	First	Company	City	Phone	Email
Wharton	Elise	Buffoli North America Inc.	Holland	(616) 403-6245	elise.wharton@buffoli.com
Whicker	Joel	Chem-Trend LP	Howell	(517) 545-7980	jwhicker@chemtrend.com
Whitaker	Dennis	Falcon Lakeside Manufacturing	Stevensville	(269) 429-6193	dwhitaker@falconlakeside.com
Wiegerink	Tanner		Holland		tannerwiegerink@gmail.com
Wiegerink	Gerrit		Holland	(616) 994-2954	wiegerinkg@gmail.com
Wilkerson	Thomas	Wilkast Inc.	Grand Rapids	(616) 281-2850	tom@wilkast.com
Wilkerson	Curt	Wilkast Inc.	Grand Rapids		curt@wilkast.com
Wilkerson	Emma		Ada		erwilkerson4@gmail.com
Williams	Gary	Centracore LLC	Saint Clair	(586) 776-5500	gwilliams@centracore.com
Wilson	William	Mag-Tec Casting Corporation	Jackson	(517) 789-8505	bill@mag-teccasting.com
Wisdom	John	Pace Industries, Corporate Headquarters	Novi	1-888-DIE-CAST	john.wisdom@paceind.com
Wolf	Dave	Ellwood Specialty Steel	Grandville	(800) 932-2188	dwolf@elwd.com
Wolniewicz	Randy	RDW Technical Consulting LLC	Stanton		wolniewicz1@charter.net
Worthy	Robert	SAPP Inc.	Grand Ledge	(616) 796-0777	bob@worthycompany.com
Wright	John	Gates Corporation	Rochester Hills		john.wright@gates.com
Xu	Gordon	AAM - American Axle & Manufacturing	Detroit	(313) 758-2000	gordon.xu@aam.com
Yacklich	Joseph	Shawnee Specialties Inc.	Eau Claire	(269) 461-6931	jyacklich@shawneeinc.com
Yakim	Jeffery	Hoffmann Die Cast LLC	St. Joseph	(269) 983-1102	gyakim@hoffmannndc.com
Young	Robert	Cascade Die Casting Group Great Lakes	Sparta	(616) 887-1771	ryoung@cascade-cdc.com
Zaller	Charles	Aluminum & Zinc Metal Sales Inc.	Monroe	(734) 241-2404	czaller@prodigy.net
Zech	Gary	Oerlikon Balzers Coating USA Inc.			gzech@dnfmold.com
Zecman	Kurt	Pegasus Industries Inc.	Redford	(313) 937-3350	kurt@pegasustcs.com
Zheng	Li	Gil-Mar Manufacturing	Walled Lake	(517) 316-5299	lizheng@itu.edu

2023 SCHOLARSHIP

AWARD WINNERS



Photo: Jason Los, Shantanu Phalke, Matthew Purcell, Harris Spungen, and Austin VanAelst.

NADCA CHAPTER 3 IS PLEASED TO ANNOUNCE THE FOLLOWING SCHOLARSHIPS FOR 2023.

Through these programs, we have been able to award **\$19,000 in financial aid** this year. These programs are supported by the Directory and yearly Golf Outing. We greatly appreciate our generous supports and benefactors who allow us to steward these programs.

For scholarship information or questions for any of the above programs, please email:

Steve Quirk (Scholarship Chair) | quirk@cascade-cdc.com



Shafer Magee

Shafer is a 4th year Industrial & Systems Engineering student at the University of Florida, Gainesville. He is on pace to graduate in December 2023. Over the past summer, Shafer interned with Cascade Die Casting Group in Grand Rapids, MI as an engineering intern. His experience involved general die cast operations, time studies, quality checks, and X-Ray studies.

Shafer is a first-time recipient of this scholarship.



Camden Knaak

Camden is a junior Computer Engineering Student at Kettering University, Flint. He is planning to graduate in fall 2024. He is Interning with General Motors, working with their controls engineering team. His father (Darin Knaak with Die-Tech & Engineering, Grand Rapids) got him interested in engineering and is a Kettering/GMI Alumni.

Camden is a first-time recipient of this scholarship.



Kaia Donay

Kaia is from Coldwater, Michigan and is a sophomore at Trine University, Angola. She is double majoring in Marketing and Management, as well as working on a master's degree. She is expected to graduate in May of 2025. Upon graduating, Kaia hopes to follow in her grandfather, Larry Donay, and father, Greg's, footsteps in the Metal/Die Casting Industry. She states, "I have grown up hearing about this industry and it is something that has always interested me."

Kaia is a second-time recipient of this scholarship.



Trey Plichta

Trey is from Birch Run, Michigan and is a junior studying Electrical Engineering at Oakland University, Rochester. He will graduate in the spring of 2024. Trey interned at Yanfeng Automotive Interiors and will be interning at Nexteer Automotive in the summer of 2023. He states "my first internship experiences really got me interested in injection molding and the die casting processes. Upon graduation, I plan to work in the automotive industry, hopefully at a company that does these things."

Trey is a first-time recipient of this scholarship.



Harris Sprungen

Harris is from Grand Rapids, MI, and is currently studying Computer Engineering at Grand Valley State University, Allendale. He has an expected graduation date in 2024. Harris currently has an internship at BuhlerPrince. During his time with BuhlerPrince, he has helped with the develop and fine-tuning of software for operating die-cast machines.

Harris is a first-time recipient of this scholarship.



Matthew Purcell

Matthew is from Grand Rapids, MI, and is a non-traditional student studying Product Design Engineering at Ferris State University, Big Rapids. He will graduate in the summer of 2024. Matthew is currently employed by Cascade Die Casting as a Cad Designer in their Simulation Department. Matthew states that "I have enjoyed learning about the die casting industry and hope that I can continue to develop a greater understanding of the field."

Matthew is a first-time recipient of this scholarship.



Jason Los

Jason is pursuing an MBA from the Seidman College of Business of Grand Valley State University, Allendale. He is expected to graduate in the spring of 2024. Jason currently is a Product Category Manager for the Hybrid Collaboration category within Steelcase, where he promotes the use of high-pressure castings during the development of new products. Additionally, Jason is an alumnus of the Buhler group, where he held many roles serving the high pressure die casting industry over 15 years. He is a first-time recipient of this scholarship.

Trey is a first-time recipient of this scholarship.



WMU ENDOWMENT WINNERS

We are pleased to also announce that we were able to provide three endowment awards to students at Western Michigan University in the previous year. These individuals were picked by an independent board based on several criteria. All three winners are also apart of the industry sponsored Die Cast In a Box 4.0.

Congratulations!

Shantanu Phalke (Left)

Austin VanAelst (Right)

Andrew Brewski (Not Pictured)

THE BEST OF TWO WORLDS

UDDEHOLM TOOL STEELS AND EIFELER PVD COATINGS

Combining the right Uddeholm tool steel such as Uddeholm Dievar® (≥18.4 ft-lbs. toughness value) or Uddeholm Unimax® with a PVD coating from voestalpine eifeler Coatings can increase productivity and achieve higher quality processed components.

FAILURES THAT CAN BE SOLVED BY THE RIGHT STEEL

- Gross cracking, heat checking and indentations are failures which can be solved or reduced by changing the steel grade or the hardness level.



FAILURES THAT CAN BE SOLVED BY PVD COATING

- Erosion, corrosion or soldering problems on cores, ejector pins and cavities (with simple geometry).
- Abrasive wear in Hot Stamping.



EXAMPLE OF COATINGS FOR HOT WORK STEELS

COATING	COATING TYPE	COLOR	KEY PROPERTIES	THERMAL LIMIT
CROSAL®-plus	AlCrN	Slate gray	<ul style="list-style-type: none"> • High oxidation resistance • Outstanding hot hardness 	2012°F (1100°C)
Duplex-TIGRAL®	AlCrTiN	Gray	<ul style="list-style-type: none"> • High hot hardness • Excellent oxidation resistance • Excellent abrasion resistance 	1650°F (900°C)
Duplex-VARIANTIC®	TiAlCN	Old rose	<ul style="list-style-type: none"> • Good chemical resistance • Low friction • Good oxidation resistance in semi-warm-forming 	1470°F (800°C)



USA/Canada: 1-(800) 638-2520
Mexico: 0052 442 349 79 45
uddeholm.com



eifeler: 1-(630) 587-1220
eifeler.com/northamerica

In 2023, we will again be at **Saskatoon** after many rave reviews of the course condition, fantastic food and services! We anticipate a record turnout again for this year so please consider responding quickly for our event in 2023. We offer opportunities for golf as well as various sponsorships, as you will reach a wide, diverse audience, second only to the NADCA National Cast Expo.

Thank You, Sponsors

Thanks to our magnificent golf sponsors, NADCA Chapter 3 was able to award direct scholarships for 2023 to **SEVEN** worthy young people so that they can attend school that focuses on their potential employment in the die cast industry. We also support a WMU Scholarship Endowment to assist needy students in the WMU casting program. In addition, we are a major supporter of the WMU Casting Short Course that exposes interested high school students to metal casting.

What's more, we are able to offer our meetings free to involved high school and college students interested in the die cast industry. This is all due to our golf and directory sponsors, and we thank you so much. To see a list of our 2022 sponsors and photos of some of the world class athletes who participated in our 2022 outing please go to nadcachapter3.org, and feel free to browse our website, see what more we offer, and make plans to sponsor our 2023 event.

Join Us As A Member

Due to our brilliant and generous golf sponsors, we offer the business and dinner meetings free to all chapter 3 members as well as students. So please join NADCA and request membership in Chapter 3.

So remember, go to the website listed below and sign up for our 2023 Outing. Also, remember this is the best venue to spend your die cast advertising budget, because you'll not only be seen, but also help education efforts in the die cast field.

Registration Continues Online

Since 2019, our sign-up for the golf event was handled exclusively by our website listed below.

2023 Golf Outing Date:
August 18, 2023
at Saskatoon Golf Club



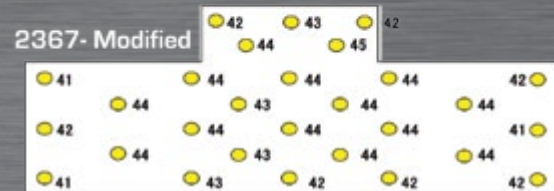
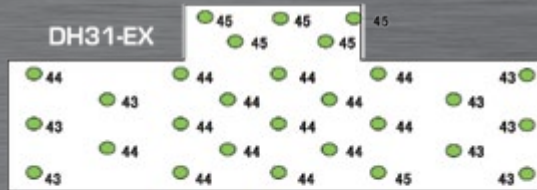
Register your foursome at:

<https://nadca-chapter-3-2023-golf-outing.perfectgolfevent.com>

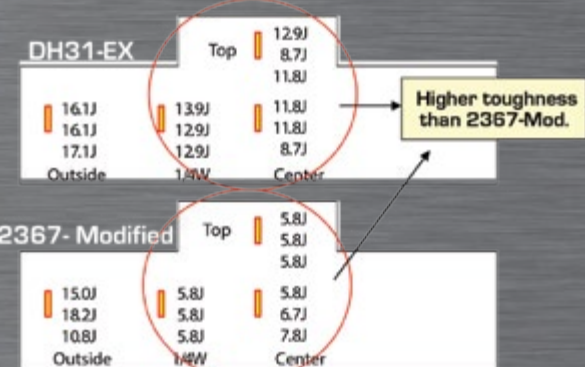
INTERNATIONAL MOLD STEEL, INC.

WHEN IS TOOL STEEL SIMILAR, BUT NOT THE SAME?

Hardness Values



Charpy Impact Values



Both blocks were heat treated in the same furnace at the same time to achieve same hardness.

When it comes to Charpy impact values – DH31-EX has significantly better core properties than 2367-Modified, due to the higher hardenability of DH31-EX.

Additional benefits include better heat check and gross cracking resistance along with reduced tool maintenance.

Result: Longer tool life and better parts.

DH31-EX—NADCA certified since 2011



A Daido Steel Partner Company

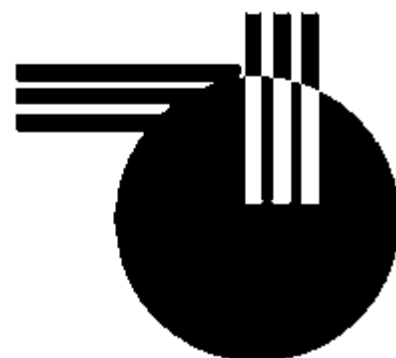
High Hardenability Grades:
DH31-EX* & DHA-World*
*NADCA CERTIFIED



International Mold Steel, Inc.
1155 Victory Place
Hebron, KY 41048 USA

859.342.6000 IMSTEEL.COM

DO-RIITE - ZU DIE & ENGINEERING CO.



2023 GOLF OUTING SPONSORSHIP OPPORTUNITIES

Golf Towel Sponsor

\$4,000

- Company name on golf towels given to each golfer

Sponsorship limited to **1** sponsor

Deadline: July 8th

NADCA Event Sponsor

\$3,000

- Company logo on a large welcoming banner displayed on the clubhouse
- Contact information on all documents

Sponsorship limited to **1** sponsor

Golf Ball Sponsor

\$2,750

- Company name on golf balls given to each golfer

Sponsorship limited to **1** sponsor

Rent a Hole

\$2,000

- Display company work, host a give-away, or whatever you wish
- You will be responsible for staffing any activities at your hole

Limited to **5** sponsors

Dinner Sponsor

\$750

- Company logo on a large banner displayed in dining area

Sponsorship limited to **9** sponsors

Vendor Night Reception Sponsor

\$700

- Display company literature on tables
- Gippers Sports Bar
- Aug 17th at 5:30pm

Sponsorship limited to **10** sponsors

Hole Flag Sponsorship

\$500

- Company name on a hole flag (the flags will be yours to keep)
- Flags will be presented to sponsoring companies after dinner

Sponsorship limited to **18** sponsors

Deadline: July 8th

"Keg at the Turn" Sponsor

\$475

- Company logo on a large banner displayed in dining area

Sponsorship limited to **18** sponsors

Breakfast Sponsor

\$375

- Company logo on a large banner displayed in dining area

Sponsorship limited to **9** sponsors

Hole Sponsor

\$250

- Company name on a tee box on each course

Sponsorship limited to **90** sponsors

Range Ball Sponsor

\$200

- Company logo on a large banner displayed in dining area

Product Sponsor

- Donate products to be used as raffle prizes or in outing prize bags

Additional sponsorship opportunities available upon request.

All sponsors are also mentioned on the rule sheet, sponsor sheet on each table at dinner, and noted on the chapter web site.

Deadline: July 29th

For more details or to make a donation, visit:

www.nadcachapter3.org
<https://nadca-chapter-3-2023-golf-outing.perfectgolfevent.com/>

2022 DIE CASTING AWARD WINNERS

For the last 48 years NADCA has sponsored its International Die Casting Design Competition to showcase outstanding die cast designs, while acknowledging the continuous contribution die casters provide to the manufacturing industry.

Larger parts than ever before can be die cast in the world of Mega casting and Giga casting. Large or small though, die castings need to meet customer quality requirements. This is exemplified in the winners of the 2022 International Die Casting Competition. Ranging from just a few ounces to nearly 100 pounds the winning castings show how die casters, working with their customer, can produce high quality, well designed parts. Additionally, many of the winning castings were able to reduce the cost by minimizing or eliminating secondary operations.

Categories in the competition are grouped by material and include aluminum, magnesium, zinc and other alloy families, including aluminum and magnesium structural die casting. Both custom and captive casters are eligible. For each category, there are four equally weighted criteria: ingenuity of casting and/or product design, overall quality, cost savings as compared to other manufacturing processes, and the part's contribution to expanding the market for die castings. A panel of independent judges, acknowledged experts, with no ties to eligible casters, choose the winners.

NADCA will honor this year's award winners at its 2022 Die Casting Industry Awards Luncheon on Wednesday, September 14 at 12:15 - 2:00 pm during the Die Casting Congress & Tabletop in Lexington, KY. The luncheon is an exceptional opportunity to meet this year's winners and learn more about their innovations.

TO COMPETE IN 2023

Innovative die casting design entries may be entered in the 2023 Die Casting Design Competition. All award-winning castings will be displayed next year at NADCA's Die Casting Congress & Tabletop, September 19-21 in Grand Rapids, MI.

The competition is open to die castings from aluminum, magnesium, zinc, semi-solid & squeeze, and other alloy families. Within each category, there are more specific levels: aluminum under 1 pound; aluminum 1-to-10 pounds; aluminum over 10 pounds; aluminum squeeze/semi-solid; aluminum any size with decorative finish; zinc under 6 ounces/non-electroplated; zinc over 6 ounces/non-electroplated; zinc any size with decorative finish; magnesium over 0.5 pound; and magnesium under 0.5 pound.

Any number of die castings may be entered in the awards competition. Complete and submit a separate entry form for each casting or assembly of castings. As-cast entries are required (post trimming). The metal surface cannot be improved or concealed by tumbling, shot blasting, coating or other surface treatments. NADCA encourages sending secondary processed samples, but these must be in addition to the as-cast parts.

Castings submitted for the competition MUST have approval in writing from the customer allowing NADCA to use the casting(s) in exhibitions and magazine articles. When possible, information and photographs describing the design process will be published in Die Casting Engineer magazine, but because of proprietary reasons, not all information can be shared. Such exceptions should be noted on your entry form.

More information and electronic entry form can be found at www.diecasting.org/castings/competition. All entries must be submitted by June 15, 2023. For more information, contact: Beau Glim at glim@diecasting.org.

Send sample casting(s) to:
NADCA - 2023 Casting Competition
3250 N. Arlington Heights Rd., Ste. 101
Arlington Heights, IL 60004

2022 AWARD WINNERS

ALUMINUM – 1 TO 10 LBS RANE LIGHT METAL CASTING INC.

PART: Bearing Drum Housing
MATERIAL: A383
WEIGHT: 7.5 lbs (3.4 kg)
END MARKET: Appliances

CASTER AWARD NOMINEE:
Larry Johnson
CUSTOMER:
LG Electronics USA

FUNCTION OF PART

Bearing housing that will be over molded for the plastic outer washer tub assembly.

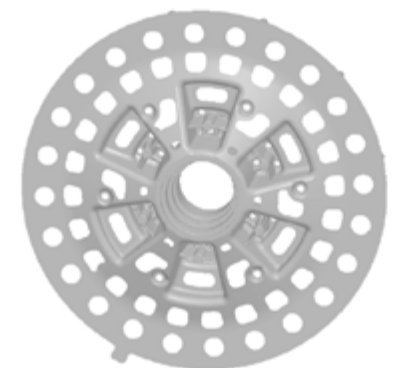
PREVIOUS PROCESS TO PRODUCE PART

High Pressure Die Casting process that was vented to the atmosphere. Non-fill quality issues.

ADVANTAGES GAINED

Process and tool improvements, including the use of MFT vacuum, vastly improved the quality of the casting. Lead to a significant reduction in casting rejects, which improved production and cost metrics at die caster and customer.

Rane Light Metal Casting Inc.
232 Hopkinsville Rd.
Russellville, KY 42276 USA



ALUMINUM – STRUCTURAL

SHANGHAI LI XIANG AUTOMOBILE

PART: Rear Floor Frame
MATERIAL: Alcoa CSMET C611
WEIGHT: 89.3 lbs (40.5 kg)
END MARKET: Automotive

CASTER AWARD NOMINEE:
 Shanghai Li Xiang Automobile Co., Ltd.
SPECIAL RECOGNITION:
 Alcoa

FUNCTION OF PART

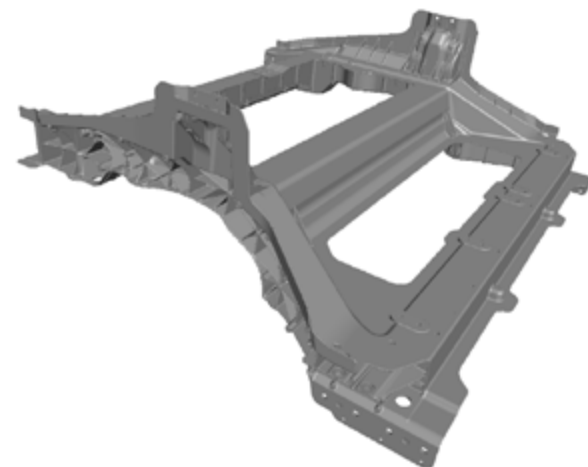
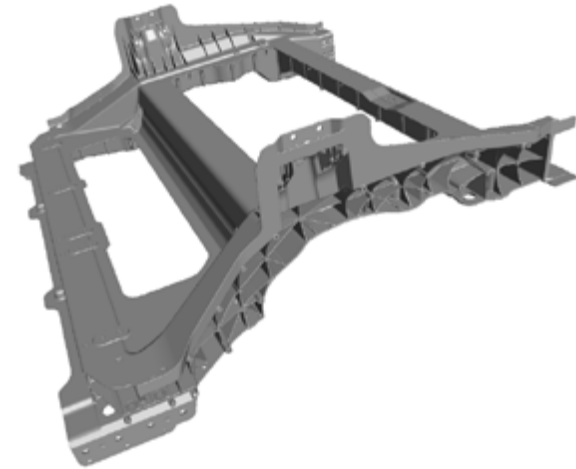
Allows for installation of rear chassis and seats, while being a safety critical feature of the rear body.

PREVIOUS PROCESS TO PRODUCE PART

40+ piece assembly of metal components, including aluminum die castings, aluminum extrusions, and steel stampings. Aluminum die castings are heat treated.

ADVANTAGES GAINED

Reduced the 40+ components to a single component with elongation greater than 10%, yield strength greater than 130 MPa, and ultimate tensile strength greater than 250 MPa in the as-cast condition – eliminating the heat treating step, while keeping the crash worthiness. The high elongation also allows the casting to be joined to other components with Self-Piercing Riveting (SPR). The integration of the 40+ components into the single casting reduced the weight by 20%, decreased in-house manufacturing cost by 20-30%, and shortened the auto body product development cycle by six months.



Shanghai Li Xiang Automobile Co. Ltd.
 No. 111, Yutian South Road, Anting Town,
 Jiading District
 Shanghai, China 201805

ALUMINUM – SEMI-SOLID

DYNATOOL INDUSTRIES INC.

PART: Hinge Pillar
MATERIAL: A356
WEIGHT: 10 lbs (4.5 kg)
END MARKET: Automotive

CASTER AWARD NOMINEES:
 Jean-Claude Tawil & Stephane Bergeron
CUSTOMER:
 Rivian

FUNCTION OF PART

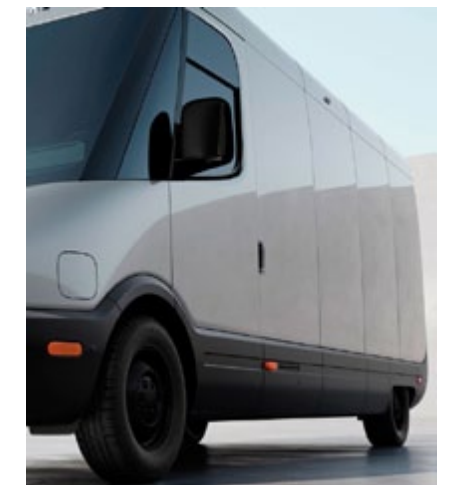
Part of the door structure and directly supports the large driver's door, as it integrates the hinges. Connects and holds together different sheet and extruded aluminum components forming the door structure. Crash relevant.

PREVIOUS PROCESS TO PRODUCE PART

New part for a new vehicle. Normally would be an assembly of various metal components, typically stamped sheet, cast, and or forged and welded.

ADVANTAGES GAINED

Vacuum Rheocasting process was selected for various advantages for structural parts: crash relevant, withstand high loads, welded to 5000 series sheet and 6000 series extrusion aluminum components. This process enables production of sound/high integrity castings even in thick sections, which can be heat treated at much higher temperatures than conventional vacuum die castings for best properties and easily welded. Alloy A356 (in T6 temper) was selected for its high mechanical properties, economical availability in the market, and ability to cast components from 100% clean post-consumer wheels (eccomet356.2), which makes the carbon footprint of the castings far lower than with any other structural die casting alloy, increasing sustainability. Additional alloy development is now being conducted with Rio Tinto to achieve best properties also in F and T5.



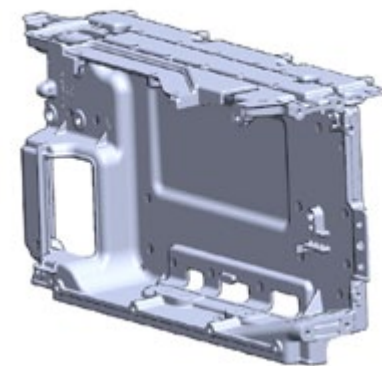
Dynatool Industries Inc.
 3540 St. Patrick St.
 Montreal, Quebec H4E 1A2

MAGNESIUM OVER 0.5 LB

MERIDIAN LIGHTWEIGHT TECHNOLOGIES

PART: Battery Charger Housing
MATERIAL: AZ91D
WEIGHT: 5.2 lbs (2.35 kg)
END MARKET: Automotive

CASTER AWARD NOMINEES:
 Xu Wang, Gerry Wang, and Jonathan Weiler
CUSTOMER:
 Subaru Corporation



FUNCTION OF PART

Housing for an electric vehicle battery charger.

PREVIOUS PROCESS TO PRODUCE PART

Two-piece assembly of aluminum high pressure die castings.

ADVANTAGES GAINED

By switching to magnesium die casting the housing weight was reduced by 25%, cost was cut by 30%, and self-threading fasteners could be used.

Dynatool Industries Inc.
 3540 St. Patrick St.
 Montreal, Quebec H4E 1A2

ZINC UNDER 6 OZ

LAKESIDE CASTING SOLUTIONS

PART: ZPR Slide, 2-Tier
MATERIAL: Zamak 5
WEIGHT: 0.2 oz (5.7 g)
END MARKET: Clothing

CASTER AWARD NOMINEE:
 Adam Yager
CUSTOMER:
 Constant Mountain



FUNCTION OF PART

Used on outerwear to zip the outside of the jacket, while also forming an interior pocket (similar to a hooded sweatshirt). This allows customers to experience the comfort of the patented hands together functionality.

PREVIOUS PROCESS TO PRODUCE PART

Initial prototypes were made with 3D printed plastic. Follow up prototypes were made with brass and then plated with gold and rhodium.

ADVANTAGES GAINED

Zinc die casting allows parts to be produced in the quantities required by the customer at a competitive cost, while also providing quality and reliability.

Lakeside Casting Solutions
 #2 Lakeside Dr
 Monroe City, Missouri 63456 USA

ZINC OVER 6 OZ DECO PRODUCTS

PART: Modern Storage Foot
MATERIAL: Zamak 3
WEIGHT: 17.2 oz (0.49 kg)
END MARKET: Furniture

CASTER AWARD NOMINEE:
 Jacob Stoll
CUSTOMER:
 HNI Corporation

FUNCTION OF PART

Used to support a storage unit, providing an elevated aesthetic.

PREVIOUS PROCESS TO PRODUCE PART

New part. No previous production method.

ADVANTAGES GAINED

A high quality surface finish was created on the part to provide aesthetics despite the challenges of a deep cavity and limited gating area. Several different modifications were made to direct the flow deep into the cavity, while also providing ribs to add to the structural integrity. Overflows and chill blocks were engineered to be on the same plane as the gate to pull air out of the casting. Modifications were verified using flow simulation.

Deco Products
 506 Sanford St.
 Decorah, Iowa 52101 USA



ZINC – DECORATIVE FINISH DST TECH PRIVATE LIMITED

PART: Sensor Housing Wall Plate
MATERIAL: Zamak 3
WEIGHT: 14.5 oz (412 g)
END MARKET: Plumbing

CASTER AWARD NOMINEE:
 Sandeep Tandon
CUSTOMER:
 M/S Sloan Valve Company

FUNCTION OF PART

Houses infrared sensor for auto flushing urinals/ bidets.

PREVIOUS PROCESS TO PRODUCE PART

Typically made in plastic or sheet metal.

ADVANTAGES GAINED

Unique “ultra light” runner (1.5 oz runner for 14.5 oz casting). “Pyramid diffuser” and sprue shape match the feed system. Simplified trimming by using the “sensor window” to design the feed system. Step gates match the section volume and length of travel to ensure simultaneous filling. Tapered runner theory used to provide accelerated flow. Very high yield (72%). Uses four slanting ejectors, which move in unison to prevent warping, to create snap on features common in plastic. Aesthetically superior to sheet metal and plastic plates.

DST Tech Private Limited
 1422, MIE Part B
 Bahadurgarh, Haryana 124507 India





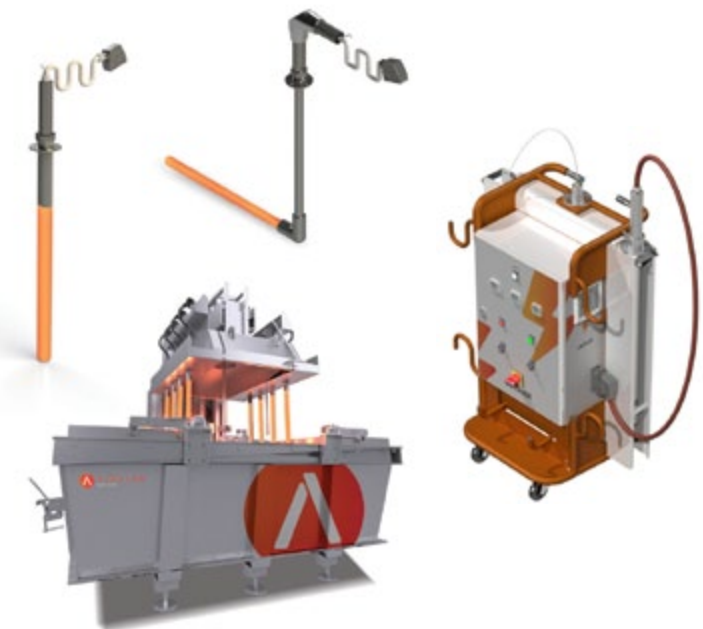
Jet Cooling Systems



Vacuum Technology & Die Components

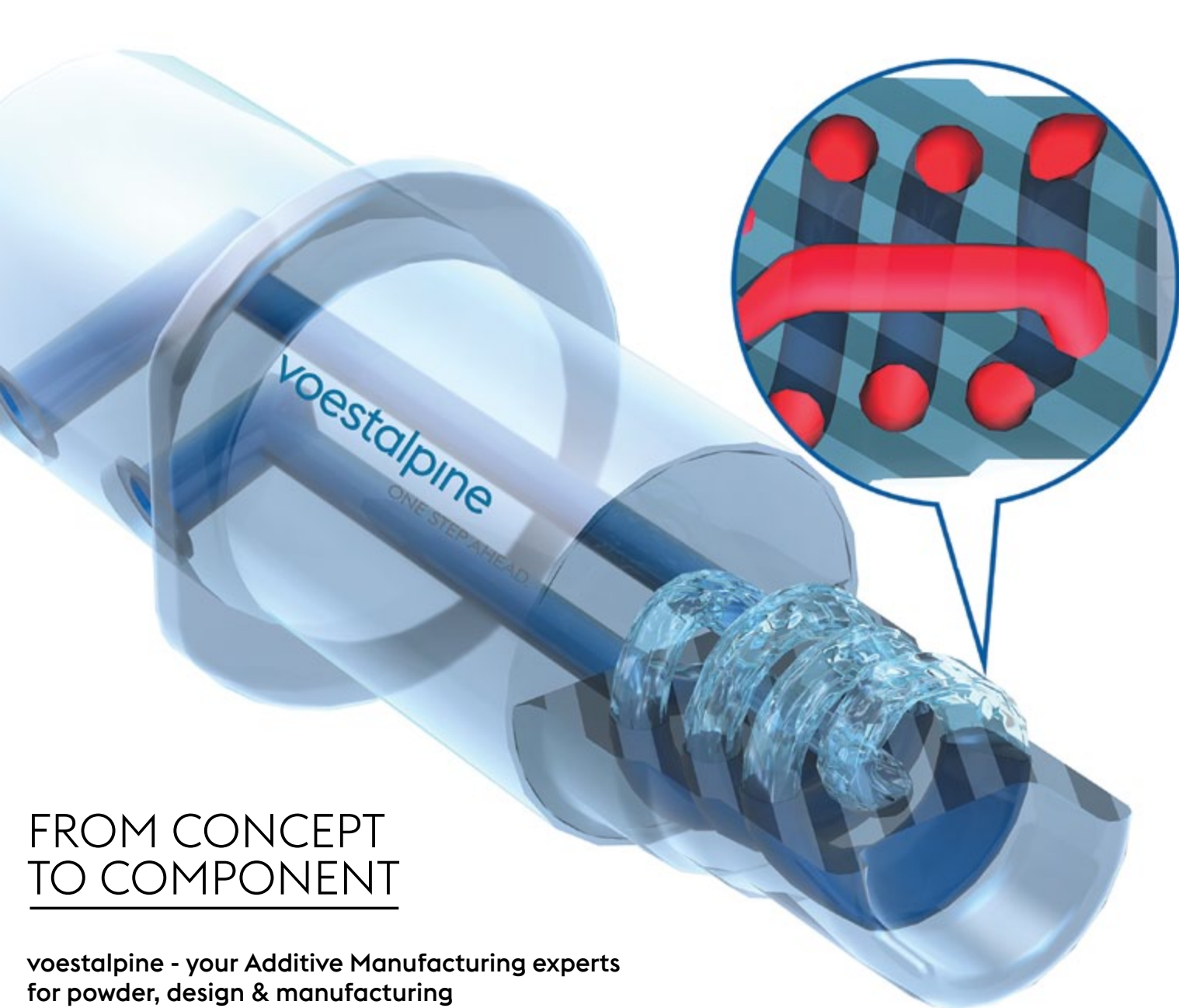


Furnaces & Heaters



2022-2023 BOARD MEMBER INFORMATION

Position	Name/Company	Phone/Cell	Email
Chairperson <i>Elected 1/23 thru 2023</i>	Todd Ikerd Auto Cast	616-534-4941	tikerd@autocastinc.com
Vice Chairperson <i>Elected 1/23 thru 2023</i>	Steve Barendse Carpenter Brothers Inc.	c: 231-288-7081	s.barendse@carpenterbrothersinc.com
Treasurer <i>Elected 1/22 thru 2023</i>	Phil Rozema BuhlerPrince, Inc.	616-394-8202 c: 616-520-5115	phil.rozema@buhlergroup.com
Secretary <i>Elected 1/23 thru 2024</i>	Rob McInerney	c: 616-251-8923	robmcinerney@chartermi.net
Education Chairperson	Don Torrey Hill and Griffith	c: 269-208-5770	dtorrey@hillandgriffith.com dtorrey13@comcast.net
Scholarship Chairperson	Bob McClintic McClintic & Associates	616-288-5169 c: 616-292-0454	drdiecast@drdiecast.com
Co-Program Chairpersons	Steve Quirk Cascade Die Casting Bob Worthy The Worthy Company	616-887-1771 c: 815-529-6362 c: 517-204-6430	squirk@cascade-cdc.com bob@worthycompany.com
Membership Chairperson	Mike Martin	c: 248-520-6581	michaelmartinmm@comcast.net
Golf Chairperson	Steve Ridders Allied Mineral Products	c: 616-291-6912	steve.ridders@alliedmin.com
Advertising Chairperson	Jon Burns Martinrea Metals Inc.	c: 248-260-0243	jonathan.burns@martinrea.com
Trustee	Ron Holland	c: 616-886-7947	hollander0.rlh@gmail.com
Trustee	Bill Berry DTE	616-530-9030	w.berry@dietch-gr.com
BOG Rep	Brad Guthrie Michigan Consulting Services, LLC	c: 313-587-9053	brad.guthrie@michiganconsultingservicesllc.com
Trustee	Allen Farley Cascade Die Casting	c: 616-755-5006	afarley@cascade-cdc.com
Trustee	Jeremy DeHoff Cascade Die Casting	c: 231-638-7843	jdehoff@cascade-cdc.com
Trustee	Adam Bruursema Pace Industries	231-777-3941	adam.bruursema@paceind.com
Trustee	Scott Kirkman Die Therm Engineering LLC	616-822-4016	skirkman@dietherm.com



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2023 SCHEDULE OF EVENTS

THEME FOR THE YEAR, "EDUCATION"

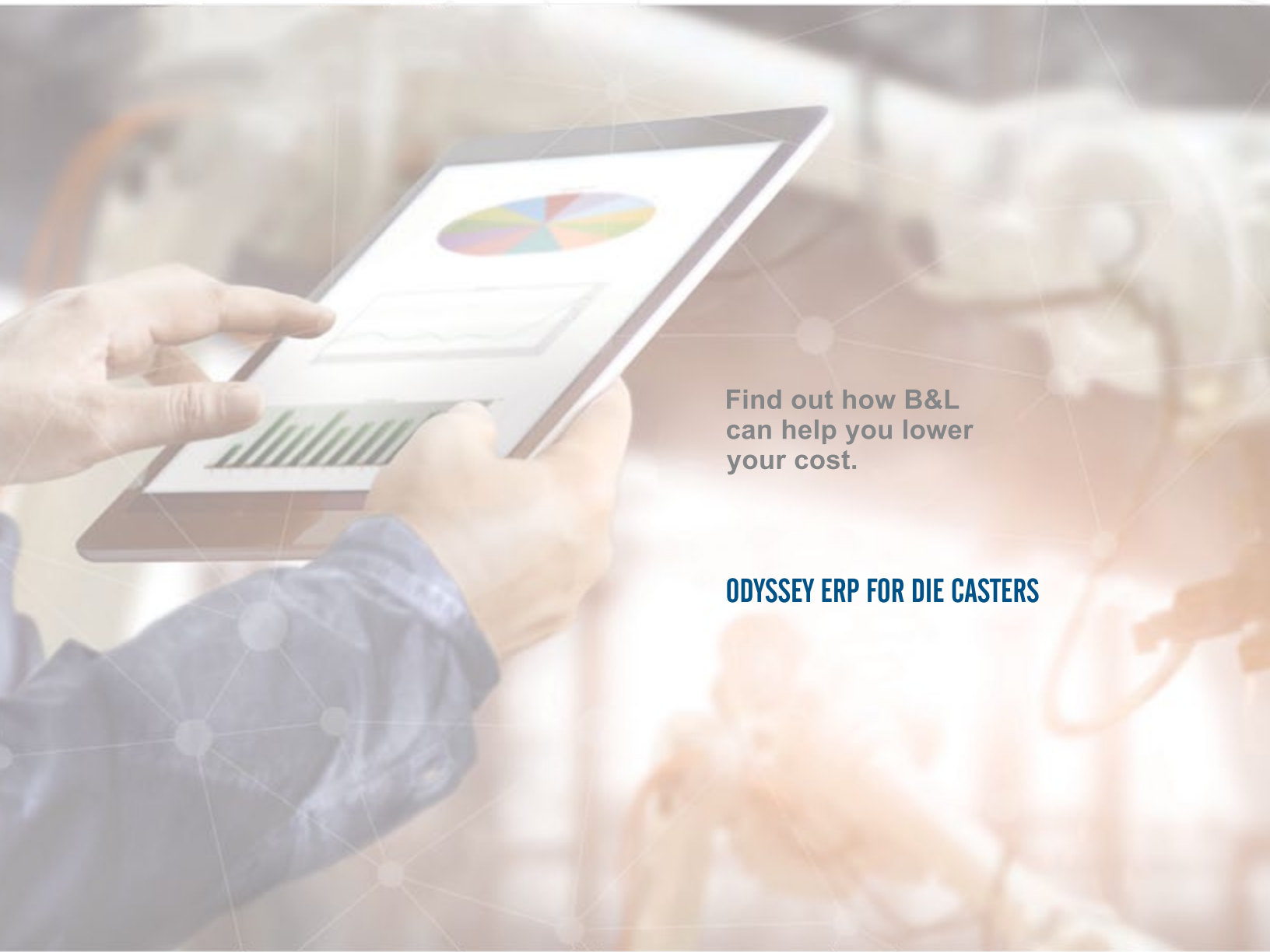
January	February	March
13 Board Meeting - DTE	Publish Directory	5-8 Executive Conference Marco Island
	23 Board Meeting	21 Board Meeting - DTE
	23 Dinner Meeting Dr. Butts (WMU)	28-30 NADCA Class Hydraulics @ Buhler
	23 WMU Campus Downtown GR	
April	May	June
24 Board Meeting	12 Board Meeting - DTE	9 Board Meeting - DTE Kick Off Golf Outing
24 Dinner Meeting State of Industry	Golf Registration Open	TBD Western MI Short Course
24 Steve Udvardy - NADCA		
July	August	September
14 Board Meeting	11 Board Meeting	8 Board Meeting
	17 Golf Vendor Night / Reception	19-23 NADCA Congress & Tabletop - GR
	18 Golf Outing	
October	November	December
13 Board Meeting	10 Board Meeting	8 Board Meeting
TBD NADCA Class Casting Defects?	2023 Kickoff	NADCA Board Elections 2023 Budget

CHAPTER 3 OBJECTIVES

The purpose and objectives of the Chapter shall be as follows:

- To advance the science of die casting and the utilization of die casting through education and research.
- To advance the knowledge and application of the science of die casting, and to institute and participate in projects for the attainment of the result.
- To support and stimulate the study and development of the theory and practice of die casting and related sciences, including engineering, metallurgy, physics, chemistry, and mechanics.
- To accumulate and disseminate authoritative scientific information relating to the development of die casting including the process, design, application, testing, and finishing as may be available through research, field experience, and special study.
- To provide, evaluate, and exchange information related to safety in the die casting industry, including its industrial hygiene, physical, and mechanical aspects.
- Educate, train, and recruit young people into the discipline of die-casting.
- The Chapter can manifest these objectives through the presentation of speakers on subjects of interest to the membership, social events where technical persons may be drawn together, acting as a conduit for scholarship awards, the presentation of technical seminars, and other activities that may enhance the objectives of the North American Die Casting Association.

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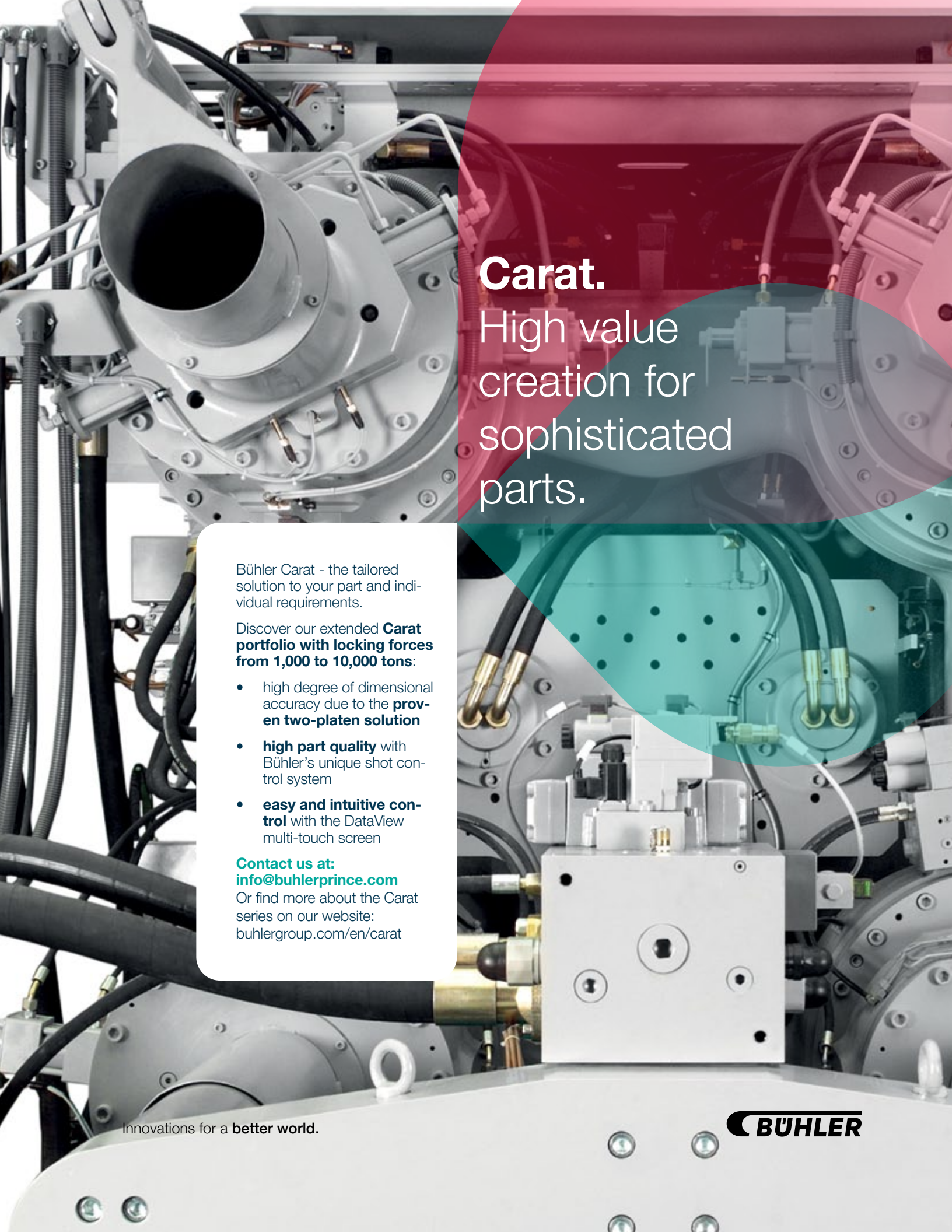
ODYSSEY ERP FOR DIE CASTERS



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Page	Company	Address	Phone	Website
C1	Century Sun Metal Treating	2411 West Aero Park Court, Traverse City, MI 49686	231-941-7800	century-sun.com
1	Die Cast Press Mfg. Company Inc.	56480 Kasper Drive, Paw Paw, MI 49079	269-657-6060	diecastpress.com
2	Buffoli North America Inc.	4508 128th Avenue, Holland, MI 49424	800-795-5536	buffoli.us
4	OEE Companies	855 Village Center Drive #336, North Oaks, MN 55127	612-440-5714	oeecompanies.com
6	Die Tech & Engineering Inc.	4620 Herman Avenue SW, Grand Rapids, MI 49509	616-530-9030	dietech-gr.com
8	Carpenter Brothers Inc.	7100 W Donges Bay Road, Mequon, WI 53092	414-418-0873	carpenterbrothersinc.com
8	Imperial Group	1700 W Fulton Street, Chicago, IL 60612	312-226-7465	imperialgp.com
10	Cal-Miser Aluminum Systems Inc.	3429 Miller Avenue, Davenport, IA 52802	847-682-3592	cal-miserfurnace.com
10	Allied Metal Company	4528 W Division Street, Chicago, IL 60651	312-225-2800	alliedmetalcompany.com
12	Auto Cast Inc.	4565 Spartan Industrial Drive SW, Grandville, MI 49418	616-534-4941	autocastinc.com
14	Aliya Analytical Inc.	3415 Roger B. Chaffee Memorial Blvd. Suite 210 Wyoming, MI 49548	616-475-0059	itothen.com
14	General Die & Engineering	6500 Clay Avenue SW, Grand Rapids, MI 49548	616-698-6961	gendie.com
16	Frech USA	6000 S. Ohio Street, Michigan City, IN 46360	219-874-2812	frechusa.com
19	PCS Company	34500 Doreka Drive, Fraser, MI 48026	568-238-4195	pcs-company.com
20	voestalpine eifeler Coatings	2222 Spikes Lane, Lansing, MI 48906	517-708-7945	eifeler.com/northamerica
22	Sinto America	150 Orchard Street, Grand Ledge, MI 48837	517-371-2460	sintoamerica.com
24	Martinrea International	603 E Church Avenue, Reed City, MI 49677	248-260-0243	martinrea.com
26	The Schaefer Group	1300 Grange Hall Road, Dayton, OH 45430-1013	937-253-3342	theschaefergroup.com
28	Noricangroup	1606 Executive Drive, LaGrange, GA 30240	706-884-6884 x3430	noricangroup.com
30	Allied Mineral Products	2700 Scioto Parkway, Columbus, OH 43221	614-876-0244	alliedmineral.com
30	Hansen-Balk Steel Treating Co.	1230 Monroe Avenue NW, Grand Rapids, MI 49505	616-458-1414	hansenbalk.com
32	Lindberg/MPH	3827 Riverside Road, Riverside, MI 49084	269-849-2700	lindbergmph.com
34	Regloplas	1088 Miners Road, St Joseph, MI 49085	888-799-4110	regloplas.com
36	Bohler - Edro	20500 Carrey Road, Walnut, CA 91789	626-592-5557	edro.com
38	Brach Machine Inc.	4814 Ellicott Street Road, Batavia, NY 14020	585-343-9134	brachmachine.com
38	Swiss Steel USA	365 Village Drive, Carol Stream, IL 60188	800-323-1233	swisssteel-international.us
40	Industrial Innovations Inc.	2936 Dormax Street NW, Grandville, MI 49418	616-249-1525	industrialinnovations.com
44	Van Hydraulics	25 Gooding Street, Conklin, MI 49403	616-887-3337	vanhyd.com
44	Bob McClintic & Associates / Dr. Die Cast	523 Lincoln Lawns Drive NW, Walker, MI 49534	616-292-0454	drdiecast.com
48	Uddeholm USA	2505 Millenium Drive, Elgin, IL 60124	800-638-2520	uddeholm.com/usa
50	International Mold Steel Inc.	1155 Victory Place, Hebron, KY 41048	859-342-6000	imsteel.com
50	Do-Rite Die & Engineering	3344 Butler Avenue, South Chicago Heights, IL 60411	708-754-4355	do-ritedie.com
60	Lethiguel USA / Midland Technologies	14800 James Road, Rogers, MN 55374	763-428-4229	midlandtechnologies.com
62	voestalpine Additive Manufacturing Centers	2595 Meadowvale Blvd., Mississauga, ON L5N 7Y3	800-655-8335	voestalpine.com/hpm/canada
64	B&L Information Systems Inc.	4707 Rambo Road, Bridgman, MI 49106	269-465-6207 x334	blinfo.com
B	Buhler Group	670 Windcrest Drive, Holland, MI 49423	616-394-8248	buhlergroup.com



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